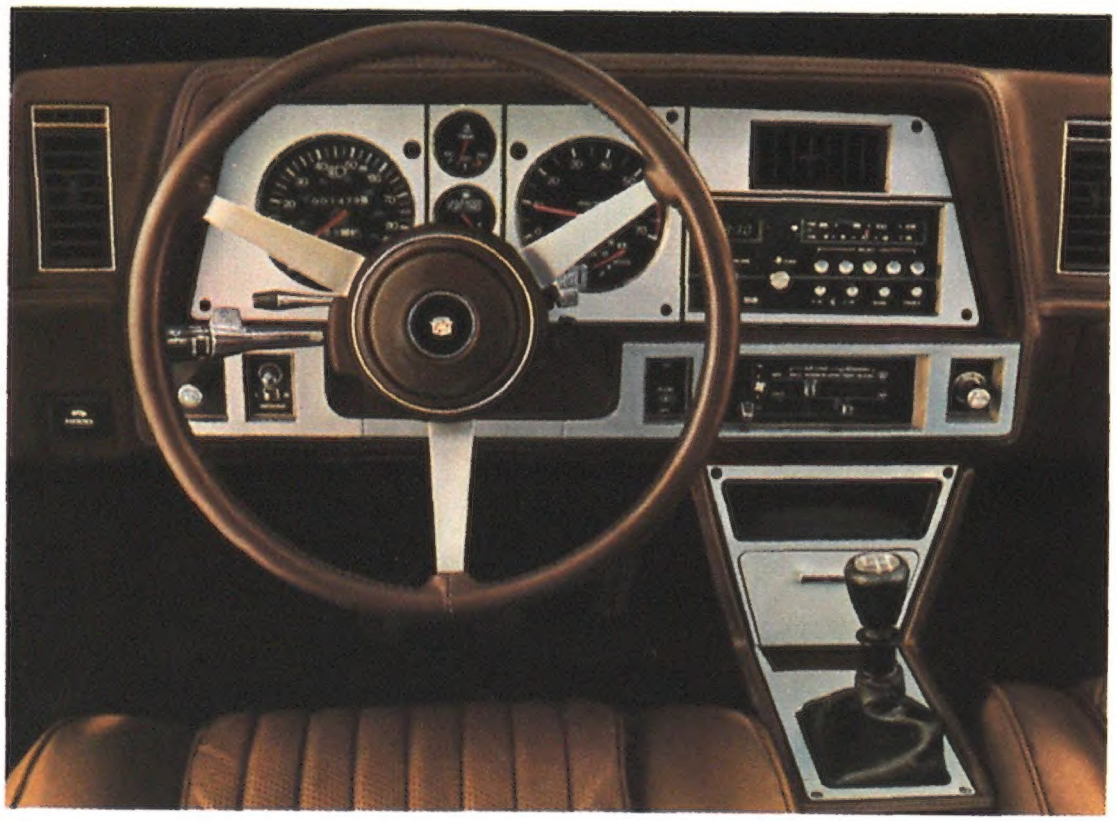
June 1981

Smithsonian

The bobcat's wild world (p. 36);
here, a 10-week-old kitten
in the California underbrush



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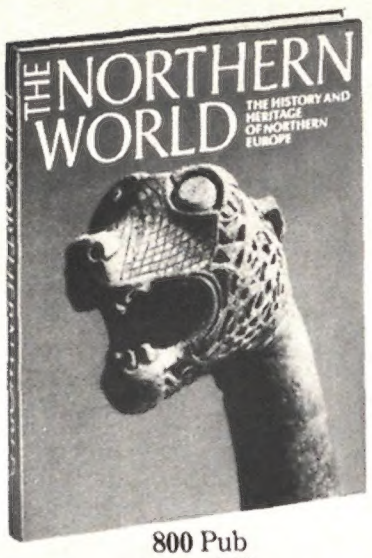

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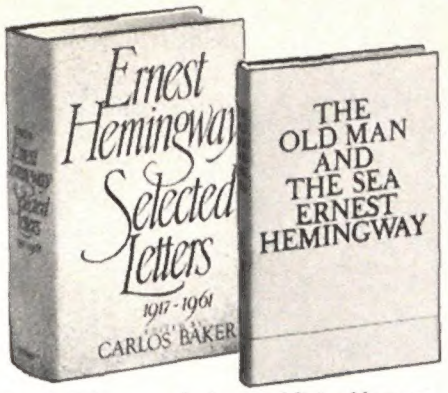

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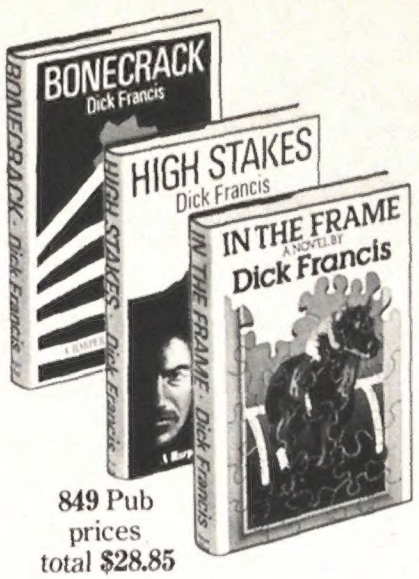

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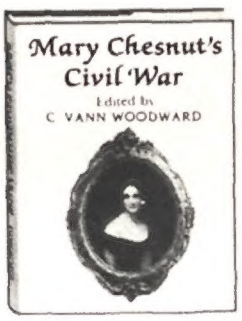

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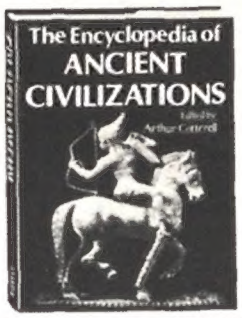

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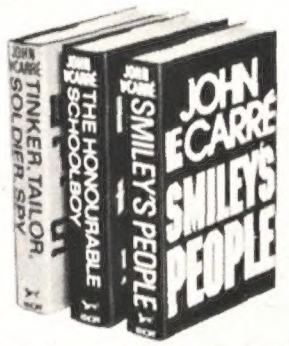

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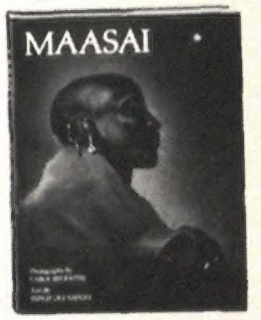

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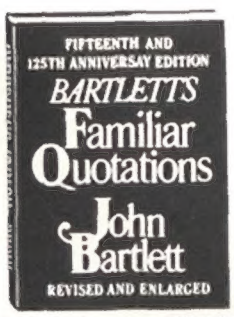

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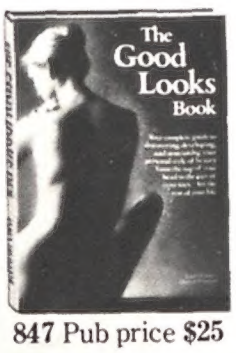

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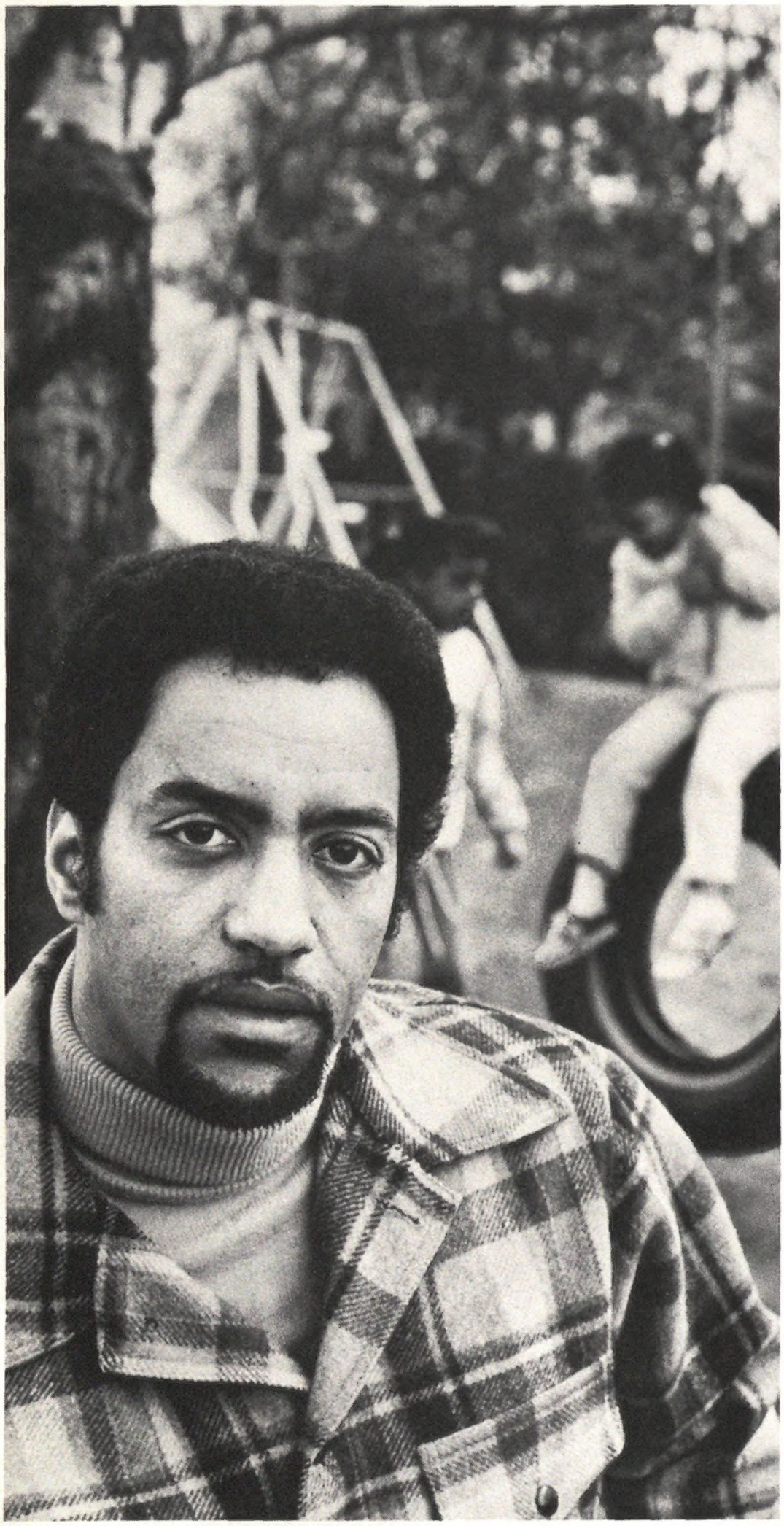

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Smithsonian (ISSN 0037-7333) is published monthly by the Smithsonian Associates, 900 Jefferson Drive, Washington, D.C. 20560.
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Subscription price $14 a year in U.S. and possessions, $22 elsewhere. Single copy price $1.25. Second-class postage paid at Washington, D.C.
Editorial offices, 900 Jefferson Drive, Washington, D.C. 20560.
Advertising and circulation offices at 420 Lexington Ave., New York, New York 10170.
Members: Please address all subscription correspondence and change of address information to P O Box 2955, Boulder, CO 80322
Postmaster: send 3579s to P.O. Box 2955, Boulder, CO 80302

June 1981

Smithsonian

Volume 12, Number 3

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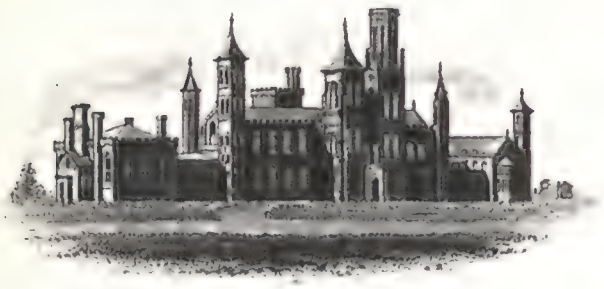
Secretary Ripley's comments

The view from the castle



State of the Smithsonian:

From the Annual Report—Part 3

In Washington today there exists a great paradox: life goes on, but not much growth. One must eat and sleep and mind one's daily affairs, but the mood is numb. Too few people look at the dome of the Capitol or the soaring thrust of the Washington Monument, and stop to reflect on what they represent—the past out of which a republic has arisen. Washington is not a symbol of inefficiency, of pettifoggers and quacks; rather, in our hearts—as in the eyes of much of the world—it is the seat of democracy where wounds are bound and hopes for future peace are established.

How can we recapture the past and find strength for the present? The two together promise hope and certainty for the future. I would venture that a walk along the nation's quadrangle, the Mall, would provide a lesson in such feelings. Start at the Capitol, stand under Thomas Ustick Walter's great dome, and wander north and south through the original vaulted spaces of Latrobe. Perhaps our readers are not aware that the huge dome, symbol of stability, is alive. It moves. Joseph Henry, the first Secretary of the Smithsonian, conducted an experiment to determine the amount of movement of the top of the dome as a result of expansion from the heat of the sun during the daytime and contraction during the cooler nighttime. He found that there was motion predominantly on a northeast–southwest axis during a 24-hour span. The top oscillates three to four inches each day.

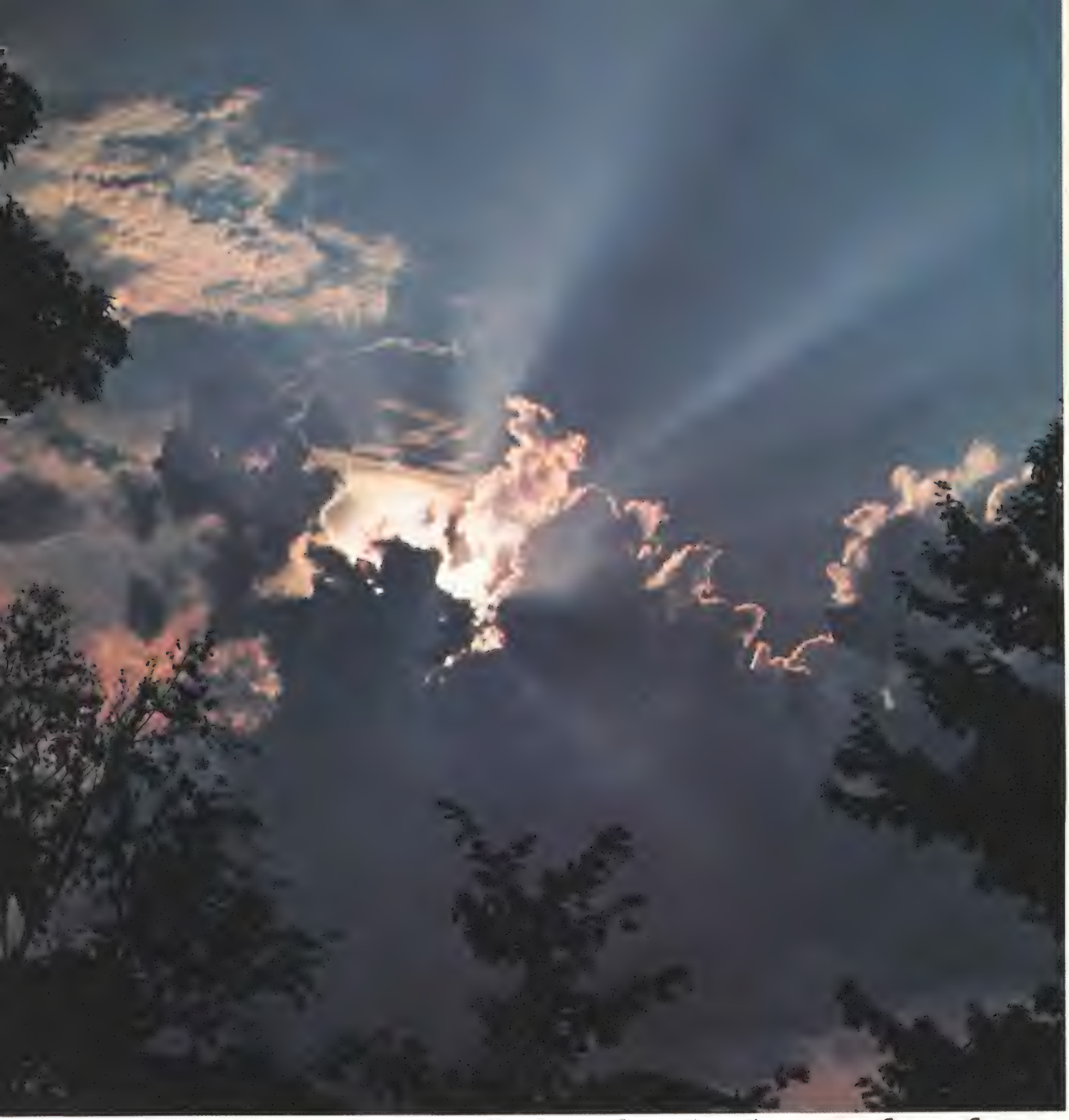
From the Capitol stroll outside, down the lawn to the grand promenade, lined with the repositories of our history. Enter one or another of the buildings by your choice, and go on as far as you can. If the result is not to produce a mood of assurance and confidence for the future, I would be surprised.

The present fashions in biology training are all in the field of cellular research, biochemical and biophysical, and molecular studies. Connected with this is the continual pressure causing many of the brightest students to move into fields of medicine. Thus it has continued to be in the years since I was myself a university professor. And yet the need for studies in the less fashionable and relatively neglected natural history field becomes ever greater, as the planet continues to suffer from overexploitation and gradual degradation of its living and inanimate resources. Ecologists are as much in need for the future of our health as medical researchers.

There continues to be a curious apathy and lack of understanding among teachers and the public alike on this subject. We toy with the issues of fossil fuels as we fiddle with the fate of our environment. It seems to be our destiny, like the cricket's, to sing the song of today and now, while still unable to think of the morrow.

Natural history museums should be in the vanguard of support for ecological research, for they contain many of the keys for understanding our future dilemmas. We can only continue to hope that the tide of fashion in biological training (and geological, too) will turn again to these disciplines in order to furnish recruits for these underestimated fields.

S. Dillon Ripley



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The intricate design of each creature will be painstakingly formed in three-dimensional relief into the center of the crystal. The crystals will also feature fine details on *both* the front and back surfaces to portray the animal as it lives in the wild. These details will enhance the three-dimensional effect and create a veritable "light show" of shimmering reflections when the crystal is held to the light.

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Shown above are four of the crystals as you might display them in your home.

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Letters to the Editor

Chimp rehabilitation

Dear Sir: I would like to tell you how much I especially enjoyed Janis Carter's article, "A Journey to Freedom," in your April issue.

Having lived for eight months in a grass hut on a reserve in southern Africa —under much easier conditions than Miss Carter has had to endure—I have an inkling of what she has had to put up with during her years in The Gambia.

People with her kind of courage and determination give hope for the survival of the world's abused wildlife.

Heather L. Brown
Atlanta

Dear Sir: I was distressed to read that Janis Carter has no radio on Baboon Island to keep her in contact with the outside world.

As a retired electronic technician and an active amateur radio ham, I would like to offer my assistance with this problem. It is possible that with the amateur radio bits and pieces I have I can build a small solar-powered portable transceiver suitable for her use.

I am very much indebted to Janis Carter for living a life from which I take vicarious pleasure.

Dale Miller
Gretna, Louisiana

Reader Miller's generous offer is appreciated, but he and others who expressed similar concern will be happy to know that Janis Carter now has a radio. Ed.

Dear Sir: Janis Carter's article is an outstanding study and application of behavior principles as applied to chimps. Obviously the same principles apply to humans and perhaps her lessons can be taught to us.

I would like to make a contribution to assist Miss Carter in her inspiring work, if you would provide me with the appropriate address.

George P. Rodes
La Jolla, California

For Mr. Rodes and others who inquired, contributions should be made payable to the Chimpanzee Rehabilitation Project and sent in care of SMITHSONIAN. *We will be happy to forward all of them to Janis Carter.* Ed.

Dear Sir: As a mother, I read "Journey to Freedom" with great emotion. This article beautifully highlights optimal parenting behavior in human beings. The author's primary goal, to create successfully functioning wild chimpanzees, was consistently maintained as a major determinant in her behavior as role model and trainer. Without this far-sighted view of her charges' survival needs, rehabilitation would have been impossible.

The same clear perception of ultimate needs combined with a gentle regard for individual personality is necessary to appropriate growth in human young. In Janis Carter's summary of the adjustment process, the demands made on the human parent are uniquely exposed, unclouded by extrafamilial issues. The tame chimpanzee's plight in the wild allows one to focus on a child's needs when faced with survival in society and to clearly see how deft the parental touch must be to achieve the balance between comfort and realism, intervention and acceptance that is fundamental to an offspring's successful adult life.

Penelope Friedman
Okemos, Michigan

Beale ciphers

Dear Sir: In regard to Ruth Daniloff's article on the search for the Beale treasure, there are two thoughts I would like to pass on to the serious buffs involved in the search. The first is: "Not the trophy, but the race; not the quarry, but the chase." From the article, I suspect that Carl Nelson would agree.

The second thought is an oldie: "Two can keep a secret if one is dead." At any rate, I wish them luck and hope that when Ciphers One and Three are broken,

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K. Gordon Fowler
Metairie, Louisiana

Dear Sir: Your article on the Beale treasure mentioned my 1973 book, *Gold in the Blue Ridge*. Your readers may be interested to know that a new updated edition with much new material on the treasure has been published by Devon Publishing Company. This edition also contains the complete *Beale Papers* originally published by James B. Ward in 1885, and copies of the three ciphers.
P. B. Innis
Washington, D.C.

Auction wars

Dear Sir: I enjoyed Michael Kernan's article, "The sumptuous, booming auction world. . . ." But, if Samuel Baker died in 1778, how could he have sold Napoleon's books from St. Helena? Napoleon was exiled to that island in 1815 and died in 1821. Surely you meant that his firm sold them.
Nancy Martsch
Los Angeles
We did, but should have made it clearer in the article. Ed.

Dear Sir: Michael Kernan's article on the auction houses of Christie's and Sotheby's was both interesting and enlightening. He has illuminated the personalities and characters of these firms that often escape the view of collectors such as myself, whose more modest means preclude close association with them.

However, I would like to point out that your photograph identified as a "19th-century suit of Japanese armor" is incorrect. From my own interest and expertise in Japanese arms, I know that this is not the *o-yoroi* of the samurai.
Bruce W. Kowalski
West Chester, Pennsylvania
Mr. Kowalski is correct. It is 19th-century Chinese court armor from the Ch'ing dynasty. Ed.

Dear Sir: Your article states that Sotheby's auction of the Garbisch estate set a record for a single-owner collection sold in America of $20.1 million. This statement is incorrect.

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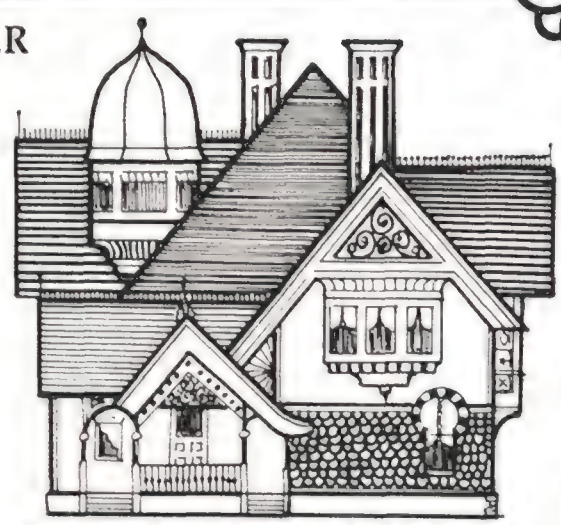

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University over the past 18 months. The sales contained the U.S. numismatic material from the Garrett Collection, which was the property of that university. The total price realized from that sale was well over $25.2 million, which eclipses any records for material sold at auction in the United States. Actually, the price for the Garrett Collection is the second highest price received for material sold at auction of any kind worldwide. The world record is held by Sotheby's sale of the Von Hirsch estate which totaled $34 million.

William D. Hawfield jr., President
Bowers & Ruddy Galleries, Inc.
Los Angeles

Chester Liebs

Dear Sir: Richard Wolkomir's article on commercial archaeologist Chester Liebs brought back memories of my childhood in Long Beach. My grandmother and I used to stroll along Rainbow Pier and throw bread to the seagulls. Sometimes we went down to the Pike. We walked up and down the midway throwing darts at balloons, riding the double Ferris wheel, eating saltwater taffy and looking at our reflections in the fun-house mirrors. We often drove home along Pine Avenue, where we watched the sailors coming out of tattoo parlors and loitering outside bars whose glaring neon signs flashed names of exotic faraway ports: "Panama," "Pago Pago," "Algiers."

Today the pier is gone, the Pike is gone, the bars are gone. I never even got to go inside for a drink. I used to think that nobody cared but me. Now I know better.

Gala Guyett
Torrance, California

Book reviews

Dear Sir: In his review of *Ernest Hemingway: Selected Letters, 1917-1961,* Paul Piazza quoted an insulting passage from a letter to Cardinal Spellman. But he fails to point out that the editor, Carlos Baker, noted in the book that perhaps the letter was never sent. Omitting such a pertinent fact is unfair to the deceased author and the reader.

Now, I'm going to tear up any unmailed angry letters I have. I'm not taking any chances.

Betsy Riley
Mineola, New York

NEW: You'd need 7 separate field guides to get all the information in this one!

Whether you're a bird watcher, a shell collector, or any lover of the outdoors, you'll want this book with you on every trip. It's the one source on all the commonly observed species—and many of the rare ones—in seven major categories. And for all its completeness, its abundant illustrations and fully detailed information, it's still compact and lightweight enough for your jacket pocket.

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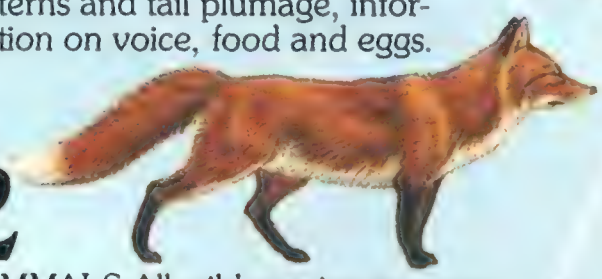
1 BIRDS are shown in all their diverse plumages, with close-ups of flight patterns and tail plumage, information on voice, food and eggs.

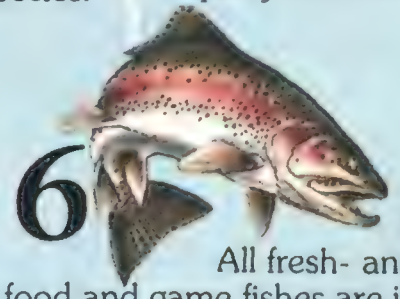


2 MAMMALS All wild species are covered, including whales, dolphins and other marine mammals. Tracks are shown where appropriate.

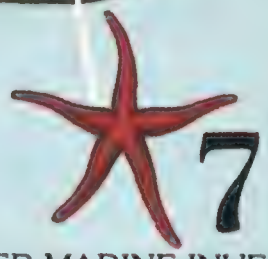
3 REPTILES Coverage includes close-ups that reveal the often subtle color and pattern differences between species. Easily tamed species are noted.

4 AMPHIBIANS are represented by more than 100 species of frogs, toads and salamanders, with details on habits, life-cycles and voices.

5 MOLLUSKS All major groups of commonly found shells are colorfully represented, as well as squids, octopi and other shell-less species.



6 FISHES All fresh- and saltwater food and game fishes are included, as well as other often-encountered species.



7 OTHER MARINE INVERTEBRATES include corals, sponges, starfish, crustaceans, jellyfish and many equally fascinating creatures.

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Mules

Dear Sir: When I read "Let's hear it for the poor endangered mules," I thought, "Hallelujah, somewhere there lives a soul so brave that he isn't afraid to write, 'Bully for mules.' " In case you thought no one else cared, count me as one who rises up to shout "Amen."

My father had a high regard for mules and used them as he hauled stovewood from our land in the Sierra Nevada down to Chico, California. Some of the teamsters drove great horses with a breast span like the trunk of a sequoia and hooves as big as dinner plates. They were beautiful creatures that moved with the majesty and ease of a huge wave rolling to shore. Nothing could stop them when they leaned into their collars.

We preferred mules. I say "we" because whatever Daddy preferred, I preferred with double enthusiasm. One of our mules cost but a small fraction of the price of a horse, and could live for three days on what a horse consumed in one meal. But pound for pound, the mule could do three times the work of a horse.

Daddy never owned one of the big Missouri mules, but we always looked them over at county fairs, and, enviously, wondered how it would feel to own such a span. Ours were always catch-as-catch-can varieties. But they served us well, and I remember them with fondness.

Mary Masters
Farmington, New Mexico

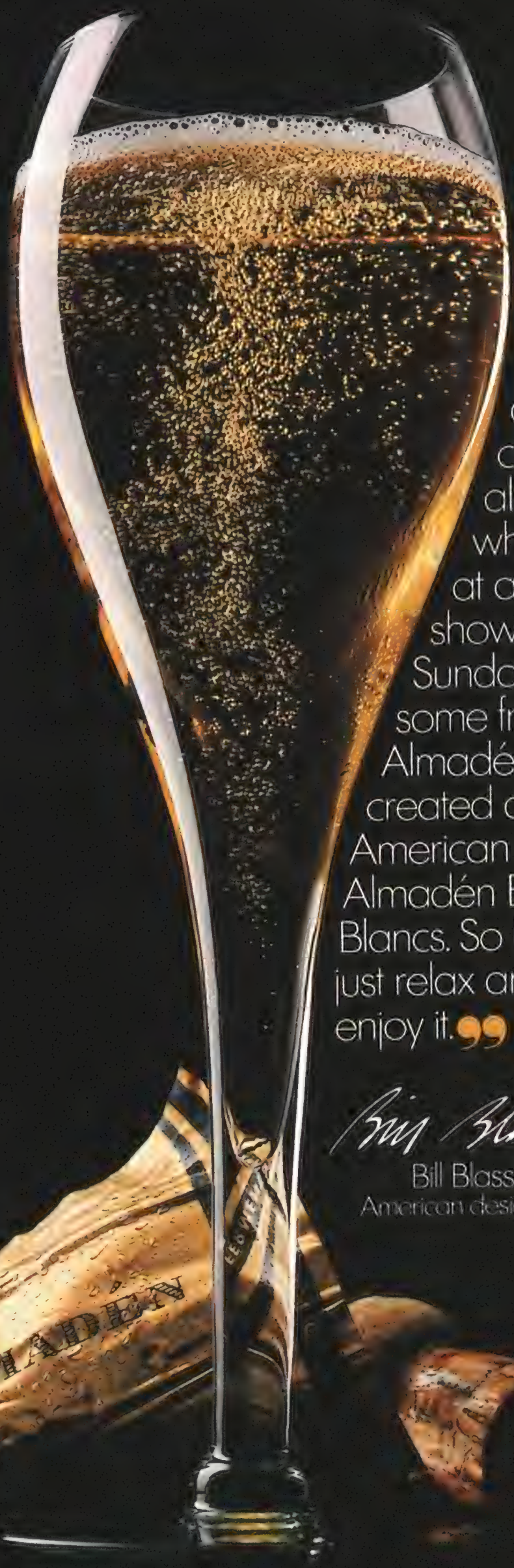
Dear Sir: Mules are alive and well and working hard in Chester and Lancaster Counties, Pennsylvania. Many Amish farmers use mulepower. My nearest neighbor uses seven mules abreast to pull his two-bottom plow, and lesser numbers for lighter tasks.

Edward C. Fawcett
Honey Brook, Pennsylvania

Dear Sir: Your article started me remembering our family mules, Pete and Jack.

I plowed many a row of cotton with them when I was just a kid, around 1915. Pete and Jack were two smart mules. About half-past 11 they began wanting to go to the house and by noon I couldn't hold them. To the house we went. There was no stopping them. Those mules knew it was dinnertime better than I did.

Gladys Maloy
Tucson



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Bill Blass
American designer

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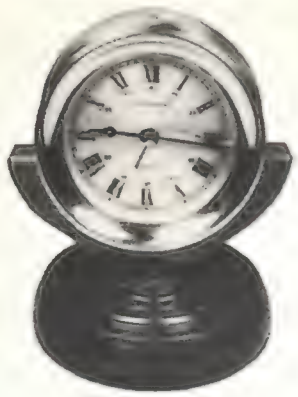

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Around the Mall and beyond

Nineteen eighty-one is the International Year of Disabled Persons, which the Smithsonian Institution is observing in a variety of ways. There will be lectures and workshops. And there's a fascinating exhibit at the Museum of American History that is entirely devoted to those disabled to whom this year is dedicated. It's called the Rehabilitation Discovery Corner, and is one of three discovery corners in the museum. The others deal with the life of the Revolutionary War soldier and with early electrical experiments.

The Rehabilitation Corner displays prostheses, those highly complex artificial legs and arms that can be made to function by using what the body has left. They are fascinating devices which, here, can be handled and worked. There are also demonstrations of sign language and hearing aids and a number of items for the blind—Braille cards, a folding prescription cane, a bell ball.

And there is a machine for audible reading that comes right out of the 21st century: the Kurzweil Reading Machine. In essence, it can read aloud 150 different styles of type. Not handwriting, though. It starts out by looking a bit like a copying machine. You raise a lid and insert your sheet of printed matter and a traveling light scans the lines. This is done on command from a push-button console. When you want to hear what the typed sheet has to say, you push the proper buttons and a synthesized voice comes out.

The Rehabilitation Corner was being demonstrated by an old friend of mine whose handicap happens to be a hearing loss, so he's got lots of interesting things to say about hearing aids—how you can adjust them to cut out background noise, for example, which sounds pretty handy for anyone who has ever worked in a city room. This docent, John, ran through a little of the Kurzweil machine procedure. He put in a typescript of the Declaration of Independence and pushed a button. The scanner swept back and forth. He pushed two more buttons and the voice began reading the second paragraph: "We hold these truths to be self-evident, that all men are created equal, that they are endowed by their Creator. . . ."

The voice was perfectly understandable, but not human. Yet it had a slightly Swedish accent. The best way to describe it is to say that it sounded like Bob Newhart imitating a synthesized voice.

Showing off, John pushed a couple of other buttons and the voice spelled out "endowed," one letter at a time. It can also tell you how to punctuate. It obeys a considerable number of commands, but it has its limits and can get pretty cheeky when improperly used. John says one operator got this reaction from the machine: "This is not a correct command. Think. It helps."

If you want to see this quite fascinating Rehabilitation Corner, you'll find it tucked away behind the medical displays on the first floor of the Museum of American History. John, or another docent, is on duty Tuesday to Friday from 11:30 to 3:00, though John says he gets wrapped up with his demonstrations sometimes and keeps on going for another hour or so.

We at the magazine are getting into the act too, in a way. SMITHSONIAN is on the list for several specialized services that provide means for the visually handicapped to *hear* what they would read if they could. The Library of Congress, of course, has long been involved with "talking books" and offers free recordings of various writings, including SMITHSONIAN. It's possible, however, that the free postage this service has enjoyed will be cut off in the belt-tightening days ahead.

Tapes are also offered by a private outfit called Volunteer Services for the Blind in Philadelphia. It has both cassettes and open reels for $16 per rental (at last look).

I found myself burrowing around on the trail of audible SMITHSONIANS and ran into a 20-year-old organization that puts out a set of records every two months which provide an oral anthology of selected articles from selected journals. *Choice Magazine Listening* is supported by the Lucerna Fund. The disks are free.

A new and original work in porcelain
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T·H·E MEADOWLAND BUTTERFLY VASE

BY JOHN WILKINSON

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Your commission must be entered by June 30, 1981.

The British artist, John Wilkinson, has been described as "the most outstanding portraitist of butterflies in the world today." And he is widely regarded as one of the foremost nature artists of our time.

Now this celebrated artist has designed his *first* work of art *in porcelain*: The Meadowland Butterfly Vase. This new work is a significant contribution to the porcelain medium, and is certain to be a source of lasting pleasure to any collector who possesses it.

The vase will be crafted in fine white porcelain—ideal for portraying the rich colors and graceful lines of Wilkinson's art. For his subject, the artist has chosen the loveliest butterflies that are seen in a sunny spring meadow. The Admiral, with its golden wings and distinctive black markings. The Painted Lady, softer in tone and elegant in flight. The Mourning Cloak, dramatic in tones of deep rust, blue and yellow. And the Purple Wing, aptly named for its shimmering beauty. Each is portrayed among the flowers that bloom in the meadow—the wild geranium, the blue violet, the forget-me-not and the larkspur.

The artist has not only depicted the variety of shades and tones of the butterflies—using 16 different colors—but has captured the atmosphere of a charming English garden as well. The height of the vase (11¼") provides ample room for this superb depiction. And, to add the final touch of refinement, the vase will be *hand-decorated* with a band of *pure 24kt gold* surrounding the crown and the base.

An elegant showpiece for the home, The Meadowland Butterfly Vase will be issued exclusively by Franklin Porcelain, and the responsibility for its creation has been entrusted to Franklin Porcelain of Japan, where there is a thousand-year-old tradition of crafting vases in fine porcelain.

A LIMITED EDITION. The Meadowland Butterfly Vase is being issued in a limited edition, and advance orders are being accepted until June 30, 1981. A later announcement will be made, but no orders for the vase will be accepted after the end of 1982. The issue price is $95 plus $3 for shipping and handling, payable in four monthly installments of $24.50 each.

To enter your commission, mail the order form at right by June 30th.

Vase shown smaller than actual size of 11¼" high. Hardwood stand included.

c 198' FP

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The Meadowland Butterfly Vase

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They go on a special low-speed player which can be borrowed, on "permanent" loan, from the Library of Congress.

CML, in Port Washington, New York, started selecting articles from five magazines and now makes unabridged selections from around 80. Its Executive Director, Marion C. Loeb, has been there from the beginning, when she was editor, and when the listeners numbered perhaps 100. Four records every other month now go to some 20,000 people, providing eight solid hours of up-to-minute journalism. I presume no one listens to all eight hours at once. That would drive you bonkers.

What's the Lucerna Fund? Well, it's a nonprofit endowment that was set up by a most concerned and yet retiring individual who would prefer to avoid publicity and whose wishes I shall honor. The money exists for this one purpose. "Lucerna" comes from the Latin for "shedding light."

Radio also puts on a number of programs for the handicapped, and SMITHSONIAN can be heard on stations that use various services—one in Ontario; one in Jamestown, New York; others in Richmond, Virginia; Columbus, Ohio; Pittsburgh; and around Washington, D.C. Some are "local" programs; some are carried by public radio stations.

Our own Radio Smithsonian has been airing programs dealing with the Institution and its work for ten years. It celebrated its first decade not long ago, and more recently, a new studio. I was allowed to peek in at the "new studio" party as long as I was quiet and kept out of the way. Chic Cherkezian, Director of the Office of Telecommunications, was there with Assistant Director Paul Johnson, who is also Executive Director of Radio Smithsonian. And they were sipping away with Ann Carroll, who is Producer, and her assistant, John Meehan. Everyone was glad to show off the new studio in the Museum of American History.

The room has sound-deadening walls on two adjoining sides, and opposite them are walls that lean inward to send sound waves ricocheting harmlessly down to the floor. When you look at them for a while you feel the walls falling on you.

Radio Smithsonian also marked its decade (a little late) by beginning to make use of the satellite system that takes care of National Public Radio. Ann Carroll

INTRODUCING DODGE MINI RAM. MORE MILEAGE, RANGE AND SEATS THAN VW VANAGON FOR THOUSANDS LESS.

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Sticker Price (MSRP at base)	**$8,137.00***	**$10,690.00***
EPA EST. MPG	18 MPG**	17 MPG**
Horsepower	95	67
Passenger Seating	8	7
Overall Length	178.9"	179.9"
Wheelbase	109.6"	95.8"
Fuel Capacity	36 gal.	15.9 gal.
EPA Est. Range	648 miles**	270 miles**
Side Door Width	49"	42"
Removable Rear Seat	Yes	No
Factory-Installed Air Conditioning	Option	Not Available
Power Steering	Option	Not Available
Color-Keyed Carpeting	Standard	$410 with int. pkg.

Dodge Trucks

DODGE TRUCKS ARE RAM TOUGH

*Sticker price comparison, excluding title, taxes and destination charges, unadjusted for different levels of standard equipment. Two-tone paint and whitewall tires $340 extra.

**Use these numbers for comparison. Your mileage and range may differ depending on speed, distance and weather. Calif. est. lower.

points out that this cuts the cost of distributing our programs.

Regular Radio Smithsonian programs are half-hour packages that may contain interviews with scientists or art historians, or visits to exhibits. They are broadly varied and often surprising and refreshing. You can get an idea of these half hours by looking in our "Highlights" section. They are distributed, says Paul Johnson, to 54 stations.

Besides these regular programs, Radio Smithsonian puts out "Smithsonian Galaxy," a series of two-and-a-half-minute features that touch on our events and activities, often behind the scenes. These hors d'oeuvres for listeners appear twice a week and subjects range from Chet Atkins and his guitar to Roger Tory Peterson and his bird books. "Galaxy" goes to some 200 stations in 44 states, free.

In striking contrast to the thundering blastoff—with its worldwide audience—of the first space shuttle, another aircraft will putter off between Paris and London this month, if all goes well. It's the *Solar Challenger,* the sun-powered plane that we described in February's SMITHSONIAN.

This brainchild of Dr. Paul MacCready, the genius who developed the first successful man-powered plane—now hanging in our National Air and Space Museum—is scheduled to cross the English Channel and churn slowly over the countryside, covering more than 200 miles at perhaps 12,000 feet altitude. It will probably take about seven hours. If your math holds up, you'll see that the *Solar Challenger*'s speed is almost 30 miles an hour.

Some comparisons come to mind. The shuttle and the solar plane are both productions of the very latest technology of the 1980s. The Columbia traveled at some 17,000 miles per hour in order to achieve orbit, and *Challenger* strains to make 1/580th of that. Moreover, 72 years ago Louis Blériot struggled across the English Channel in his monoplane capable of 40 to 50 miles per hour. He had a 25-horsepower engine. That's exactly ten times as powerful as the *Solar Challenger*'s. I don't want to have to think about how powerful the shuttle's rockets are.

All of this proves nothing except that small and weak and slow have a place in today's technology. Dr. MacCready, in fact, was recently named Inventor of the Year for his work within those comfortable parameters.

In another column a long time ago—I can't find it—I talked about surreptitiously testing the mobility of all those structural sculptures in the plaza outside the Hirshhorn. Before the guards chased me off, I found that some of them shifted and swayed and wiggled most satisfactorily. But there was one which looked as though a breeze would send it crashing down, but which proved to be as firm as Aunt Tilly's moral principles. It was the beautiful, fragile, soaring tower shown on page 28, called *Needle Tower,* made of tubes and cables of aluminum and stainless steel by Kenneth Snelson, an American sculptor who, sure enough, studied engineering.

Snelson is a nut about structure, and his sculptures are all strongly and correctly engineered, the tubes partially supportive and partially suspended on the cables. The result is a very pleasing interrelationship that evokes the same sense of tension as the rigging of a yacht.

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The 1920's and 30's marked the beginning of an era of great American design. It was during this period that the Hamilton Watch Company designed the famous Boulton watch, and it is today a collector's item.

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This Boulton limited edition utilizes the same case tools and dies, as well as the 10-K gold-filled process, that were used to produce the original watch. It is not to be confused with facsimiles or refurbished models.

The unique rectangular case of the Boulton is curved to fit the wrist, and hand polished to match the lustre of the original. The dial is solid brass with a brushed silver finish, accented with brilliant gold-plated Arabic numerals. As it was in the original, the step second hand is set off from the hour and minute hands. All hands are solid brass. The genuine pigskin strap has a 10-K gold-filled buckle.

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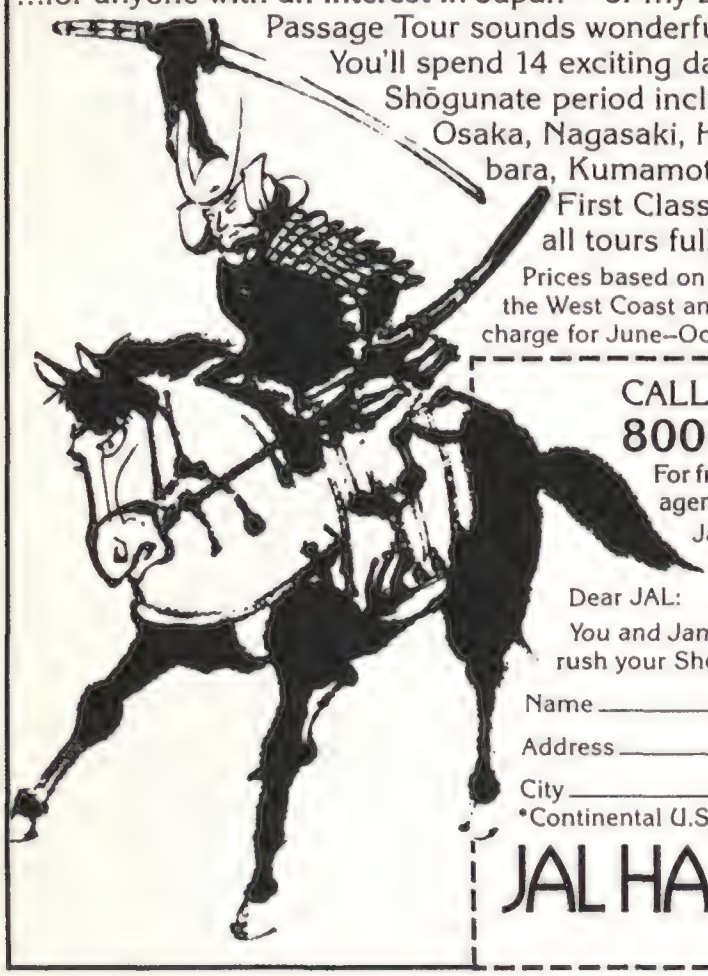

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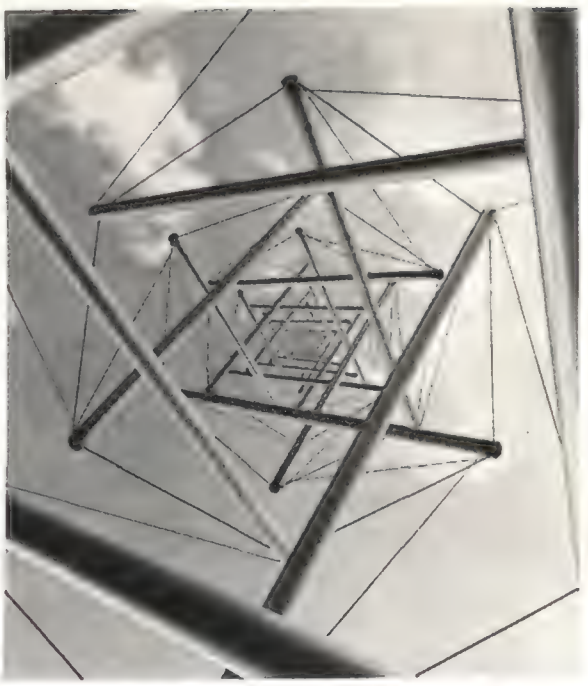

Kenneth Snelson's 60-foot *Needle Tower*.

If you want to get this feeling for yourself, perhaps you can catch Snelson at work on the Hirshhorn plaza putting sculptures which are scheduled to go on display there from June 4 to August 9.

Snelson has confused critics because of his blending of art and engineering. It becomes obvious that he must have been affected by Buckminster Fuller, the designer of the self-supporting geodesic dome, and, sure enough, Snelson did indeed come under his spell while studying art at Black Mountain College. You can get full details from the catalog.

I must report one more thing about Snelson. When harassed by critics who complained that he could not be classed as either an artist or an engineer, he replied, "Hardening of the categories leads to art disease."

—Edwards Park

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THE HERALD

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Best Loved Works of Norman Rockwell to be Featured on Important New Postage Stamps

Nations around the world to join in International postal tribute.

Stamps to feature artist's Saturday Evening Post classics.

©Saturday Evening Post 1981

Collectors can sign up now to obtain mini-sheets of these important new stamps

It is one of the greatest honors ever bestowed on an American artist and one of the most exciting stamp collecting opportunities of all time! Nations of the world are joining together in issuing special miniature sheet mint stamps in an international salute to Norman Rockwell!

Only a handful of the world's most prominent personalities have inspired such an international honor. It is a fitting testament to the man whose work has grown so popular that he is now clearly not only America's most beloved artist, but is beloved throughout the world.

Miniature Sheet Mint Stamps—the Rarest and Most Desirable Form of Stamp Collecting

What makes this international collection even more thrilling to collectors is that the stamps will be issued in *miniature sheet* form. Miniature sheet stamps are currently the rage of the stamp collecting world. If you have not yet discovered them, you are in for perhaps the most enjoyable form of stamp collecting there is!

Miniature sheets take their name *not* from the *size* of the stamps (indeed, they are often *larger* than the standard size, as they will be in this collection). Rather, such sheets are called "miniature" because they contain 20 stamps instead of the usual 40 or 50. Hence they are most *unusual*. Even more important, they are printed in far smaller quantities and thereby rank among the rarest of issues. So you can see why the Rockwell miniature sheet mint stamps are destined to be scarce—and a highly prized collectible!

All-Time Greatest Classics of Norman Rockwell—World's Most Beloved Artist

Moreover, you can imagine the extraordinary demand *these* miniature sheets will enjoy, since they feature the universally beloved work of Norman Rockwell!

Since Rockwell's death, his fame and following have soared on every continent, and it's easy to understand why. People everywhere love Rockwell because *he loved people so much.* No other artist has ever looked upon human nature with more kindness or warmth. And nowhere are these qualities displayed with more affection or skill than in his classic *Saturday Evening Post* covers, generally regarded as his finest work.

Now the nations of the world are selecting the all-time best of these Rockwell classics to be reproduced on official stamp issues—a once-in-a-lifetime philatelic event of significant international importance.

Astute Collectors Seek to Acquire Complete Stamp Issues

Most nations which issue important new stamps release a number of stamps in several denominations. The lower denomination stamps are the most common; however, astute collectors appreciate the value of acquiring complete stamp issues that include the higher denomination stamps. You can imagine the difficulty you would encounter in trying to assemble complete issues on your own, directly from the many participating nations, given the complex international transactions involved.

But fortunately, all this will be handled for you. Thus, you will be able to acquire a complete set of Rockwell Miniature Sheet Mint Stamps from every country duly authorized by *The Saturday Evening Post*'s philatelic agents to depict these Rockwell classics on official stamp issues.

A Custom-Crafted Collector's Portfolio Will Enhance Your Collecting Pleasure

Each miniature sheet (measuring approximately 9"x 9") will come to you mounted on an elegant display panel. Accompanying each miniature mint sheet will be a colorful narrative describing that particular *Post* cover and the story behind its creation.

You will also receive a luxurious custom-crafted, hard-cover collector's album designed to showcase your entire collection to its best advantage. Each mint sheet display panel will be encased in a transparent vinyl slipcase, allowing you to enjoy your collection with family and friends without harm from fingerprints or dust.

Convenient Acquisition Plan

The price of each Rockwell Miniature Mint Sheet is only $10.50 (plus 75¢ per sheet for shipping and handling). They will be shipped to you at the convenient rate of two per month. You will be billed prior to each monthly shipment—and you may charge each shipment to your credit card account. This favorable price includes the miniature sheet of perfect, mint-condition stamps mounted on a display panel... the fascinating reference narrative about each Rockwell classic...the protective slipcase...and the deluxe Collector's Album.

At this point, based on tentative stamp-issuing plans of the nations of the world, it appears there will be at least 40 to 60 Rockwell miniature sheets issued during 1981 and 1982.

Naturally, you may cancel your subscription at any time without any further obligations.

Prompt Action Required

In an international stamp program of this type, commitments must be made well in advance of the release dates of the new stamps. Therefore, to insure that we are able to acquire issues for all collectors who desire them, we must ask for a prompt reply.

As no further public announcements concerning this collection are planned, we urge that those collectors wishing to reserve a subscription at this time do so by the date shown on the Subscription Application below.

The stamps shown in this presentation are merely illustrative of those to be issued in this international postal tribute to Rockwell's Saturday Evening Post *classics. You will receive sheets of the actual stamps as they are issued by nations around the world.*

Subscription Application 038

The Norman Rockwell Miniature Sheet Mint Stamp Collection

Postal Commemorative Society
47 Richards Avenue
Norwalk, Conn. 06857

Reply requested by
June 30, 1981.

Please enroll me in the *Norman Rockwell Miniature Sheet Mint Stamp Collection.* I understand that this will be a collection of Rockwell Saturday Evening Post classics depicted on officially issued postage stamps from nations around the world. My mint sheets will be sent to me at the rate of two sheets per month at a price of $10.50 per sheet (plus $.75 per sheet shipping and handling). A deluxe collector's album will be sent to me at no additional charge.

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Phenomena, comment and notes

Some people are working to keep space exploration alive, even if they have to raise the money themselves

The space age is nearly a quarter-century old, the shuttle is reality—and yet American space exploration has slowed to a crawl. As the historians come in, the engineers are getting out. We seem to be at several turning points.

The April flight of the Columbia is one. A reusable shuttle makes it easier and cheaper to climb up into Earth orbit, where we can deploy satellites, build space stations and launch vehicles to the rest of the Solar System and beyond. We have taken a second, more solid step into space.

At the same time we are lowering our sights. We face a period of nearly five years without pictures from space, an experience unknown to anyone 16 or younger. Only a couple of interplanetary flights are on the drawing boards, and they face delays. We'll fill our own skies with communications relays, resource sensors, weather monitors, spies-in-the-sky, perhaps even weapons platforms. We'll have a 94-inch telescope above the atmosphere, able to see more than anything on the ground. But we're not going anywhere.

Last March the Smithsonian's National Air and Space Museum organized a two-day symposium under the title "Space Science Comes of Age." Some of the most prominent practitioners—James A. Van Allen, Herbert Friedman, Leo Goldberg, Robert Jastrow, Eugene Shoemaker and Lyman Spitzer jr.—recalled the early days, and a panel of historians tried to apply some perspective. NASM Director Noel W. Hinners said most attention has always gone to the manned space-flight program, and the symposium was an attempt to provide more balance.

But while Smithsonian Institution Press was distributing the symposium proceedings, *Science News* was reporting space scientists looking for jobs with oil companies. One scientist at the 12th Lunar and Planetary Science Conference in Houston was quoted as predicting that

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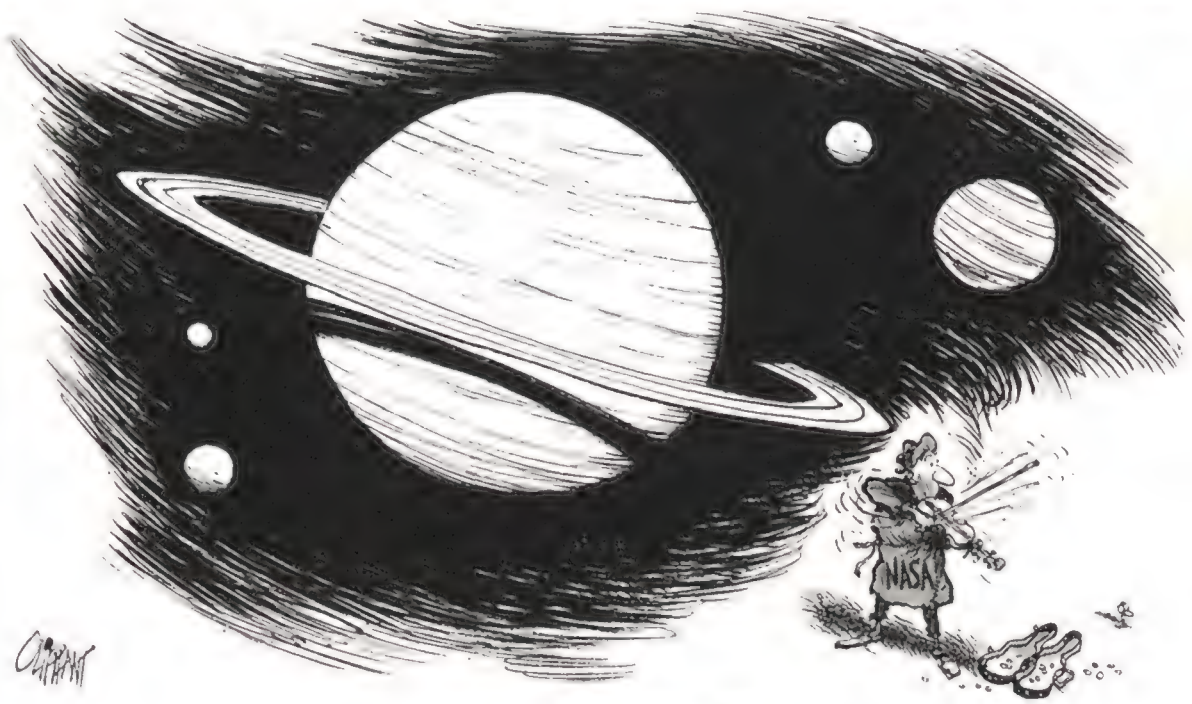

MUSIC OF THE PLANETS

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HERE'S TO GUT FEELINGS AND THOSE WHO STILL FOLLOW THEM.

Ted "Captain Outrageous" Turner

Ted Turner does lots of things people advise him not to do. And he succeeds at them. He turned Atlanta's WTBS-TV into a "Superstation" using a communications satellite and recently founded Cable News Network, the world's first 24-hour TV news network. He bought the Atlanta Braves and moved them out of last place; won the 1977 America's Cup after being fired in the '74 races; and was named "Yachtsman of the Year" four times.

Ted Turner puts his feelings where his mouth is. He also puts a great scotch there: Cutty Sark. And while he's been called Captain Outrageous by some, one thing's sure: Ted Turner's enjoying himself.

Lattick

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In August Voyager 2 will fly by Saturn, giving us our second look at that planet and its rings and moons in less than a year. After that, we have nothing on the calendar until early 1986, when that same Voyager 2 encounters green Uranus rolling along its orbit (SMITHSONIAN, December 1978). For the first time since Ranger 7 returned the first close-up pictures of the moon in 1964, the United States will go more than a year without pictures from space.

A Galileo mission to Jupiter, which would send a probe deep into the planet's atmosphere, is still on the books, although delays seem inevitable under new budget restraints. A plan to orbit Venus with imaging radar seems on even shakier ground. And time is running out on a possible rendezvous with Halley's Comet in 1986, even though engineers at the Jet Propulsion Laboratory have cobbled up a spacecraft design that makes maximum use of spare parts from Viking and Voyager and technology developed for Galileo. The Japanese, the Russians and the European Space Agency will be there; it looks as though we'll have to wait for 2061, when Halley's returns again.

Some citizens are taking matters into their own hands. One of the Viking landers on Mars is still sending back pictures, temperature and humidity readings, and even measurements of Mars-quakes. But translating the stream of binary numbers wafting back to the Earth into usable information was costing NASA $150,000 a year, and money was scarce. The time had come to pull the plug.

Two men, Eric Burgess and Stan Kent, hated to see our only weather station on Mars close down. With the blessing of the American Astronautical Society, they formed the Viking Fund on a radical premise: Why not funnel private money into the space program? They started out in November 1979 with $500 and a motto: "Feed a starving robot."

Last January 7, in a ceremony at the National Air and Space Museum, their organization turned a check for $60,000 over to NASA. The money had come from 7,000 individuals in every state and 20 other countries, in donations averaging $10. The Viking may operate for another ten years and the fund raisers hope to chip in $100,000 a year to continue the data processing.

Last spring they began a separate fund for a Halley's Comet mission as a means of expressing public support.

Viking Fund contributors are not alone. Mark Chartrand, the astronomer who directs the 18,000-member National Space Institute, estimates that 40,000 Americans belong to space-promotion groups. At least two are political action committees established specifically to aid candidates considered pro-space. Some are highly specialized, such as the L-5 Society which emphasizes space stations and eventual space colonies.

One of the most visible is the Planetary Society founded by Cornell (and *Cosmos*) astronomer Carl Sagan and Bruce Murray, director of the Jet Propulsion Laboratory. In a letter addressed to "Dear Fellow Inhabitant of Earth," Sagan points out that funding for planetary exploration has dwindled to less than one-tenth of one percent of the federal budget. He continues:

MINDS OVER MATTER

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The society lists some wonderful goals: solar sailing; planetary sample returns; a probe into the sun; robot rovers on the terrestrial planets and the four large moons of Jupiter; utilization of extraterrestrial resources, especially from asteroids; probes beyond the solar system; and the search for other solar systems, extraterrestrial life and galactic civilizations.

And, like the Viking Fund, the Planetary Society even hopes to fund some work itself: in his letter, Sagan specifically mentions the mapping of other worlds and the radio search for extraterrestrial intelligence (SMITHSONIAN, May 1978).

Space advocates are certainly a minority in this country. Testifying before a House Subcomittee in March, Chartrand quoted figures from the National Opinion Poll showing that from 1973 to 1980, the percentage of the public believing that too little is being spent on space increased from 7.5 to 18 percent while the percentage of those thinking too much was being spent declined from 58.5 to 39.1 percent (the rest thought spending was about right or had no opinion). Even with support increasing and opposition decreasing, the space advocates are outnumbered two to one.

Going into space will be the biggest turning point for our species at least since the development of agriculture. It's the headiest possibility of a heady century. In less than a hundred years we have gone from horses to rocket ships, an excellent analogy of how far we've come in our understanding of the world around us. We can go to Mars any time we want to. For 20 years we have even known how to travel to the stars. Someday we will.

When we go is up to us. So, in a sense, is who goes. We can brood about the Europeans, the Russians and the Japanese all going to Halley's Comet without the United States, or we can think of them all as spacecraft from Earth. I've always assumed—perhaps from watching *Star Trek* too often—that the starships of the future would be from Earth, not from the United States or the Soviet Union or, say, Brazil.

And one can argue that we are nowhere near being ready to go, that we cannot handle what we have now. People are starving. But who can show that turning our backs on space will in fact help solve problems here? And maybe it is perfectly natural for us to expand our niche, to reach into space for what we need. Are we really running out of metals if the asteroid belt is swimming in multimillion-ton chunks of high-quality ore?

The Space Age is old enough to attract historians. The government is cutting back, and seems to be right in line with national opinion. But the Jet Propulsion Laboratory engineers have calculated that 25 cents a year from each person in the country would pay our way to Halley's Comet in 1986. The national health organizations have done very well raising huge sums of money in small donations from millions of people. Perhaps one day we'll answer the door to find a neighborhood volunteer collecting for NASA.

—JOHN P. WILEY JR.

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Article and photographs by Hope Ryden

Following the shadowy trail of the cat that walks by itself

A naturalist tracks the shy, elusive bobcat in the wild and concludes that overtrapping could threaten the species' population

Few people are ever privileged to see a wild bobcat. I had all but despaired of doing so when, one day, I leaned down to pull a cactus spine out of my shoe and one stepped out of the Arizona brush not 15 feet away. The bold creature stretched, yawned, and turned an indifferent back on me. I was not so blasé; I wanted to shout for joy—at the very least perform a short caper! That bobcat was the first of its kind I had met in the wild in nearly a year of tracking the species.

The tawny animal was handsome, probably a male, and looked to weigh about 30 pounds. Seemingly oblivious to my presence, it began to stalk the edge of the brush, from time to time pausing to monitor sounds inaudible to my ears. As I stood and watched, I had to fight down an impulse to shoot pictures. From experience I knew that to point a camera at a wild animal the moment it reveals itself is to get a picture, if at all, of an animal in retreat.

I was mystified by the bobcat's lack of caution, so inconsistent with the species' reclusive nature. The intrepid animal sat down and nonchalantly began to wash its face with its oversized paws. A tongue-curling yawn signaled when the grooming session was over and I quickly imitated the action. The yawn, according to some ethologists, is sometimes used by members of the cat family to disarm and appease, and I was eager to send this one all the proper messages. After a short time, the bobcat made an unhurried departure and, as it wended its way into the brush, I was struck by how perfectly its coat merged with sun-splotched vegetation. How many times, I wondered, had I gazed with unseeing eyes on such a cryptic creature?

I had not planned to track wild bobcats. The book contract I had signed with Viking Press called for quite a different approach to the subject. Bobcat kittens were about to be born at the Arizona-Sonora Desert Museum (a "museum" of living animals) at Tucson, and I had been granted permission to watch and document the litter from birth to adulthood.

None of my previous animal studies had been conducted in such comfortable circumstances. To observe and write about wild mustangs, I had raced with the herds across burning deserts; to study wild coyotes I had wintered in Yellowstone National Park (SMITHSONIAN, November 1980), stomping about in polar conditions on snowshoes; and to write about the little deer of the Florida keys, I had sloshed through tangles of mangroves in swamps black with mosquitoes. Now, I planned to watch my subjects from a ringside seat.

But the litter I observed being born had not survived, and my well-laid plans had to be scuttled. Once again I set out into the wilderness, this time on the track of an animal that is a master of concealment.

Besides being well camouflaged, a bobcat hears sounds at a distance and, long before an approaching human hies into view, will slip into hiding. In time I was to observe this manifested by a California bobcat. While feeding on a road-killed rabbit I had dropped, the animal suddenly stood up in alarm. Though I could hear nothing, it dashed for cover. I did not understand until ten minutes later when a solitary hiker passed through.

At dusk, a young bobcat perches on log in California. Its eyes are well adapted for nocturnal vision.

The raccoon can be a very fierce fighter, but in Florida, having surprised one, a bobcat kills it by strangulation. Then it drags the victim home to deliver food to its nine-month-old kittens.

That a bobcat would hide from a potential enemy is natural enough, yet at times I wondered if the animal was taking perverse pleasure in playing hide-and-seek with me. For, on a number of occasions, in retracing my steps out of some remote canyon or dusty wash, I discovered fresh cat prints on top of my incoming tracks. And, now and then, when the elusive bobcat did emerge and allow itself to be seen, it walked about with the confidence of a lion.

However capricious it seemed, the species' tendency to remain quietly unobtrusive is a behavioral adaptation that has helped it to survive through evolutionary history of some 40 million years. A bobcat must conceal itself to ambush prey, for it is not physically adapted to course long distances after rabbits, canine fashion. Its lightning-fast sprints soon fade as the animal becomes winded. So a bobcat hunkers down behind a rock or glides along silently, then takes its unsuspecting victim in a sudden rush.

The species is served in still another way by its reclusive nature. Bobcats are weakly social and prefer to avoid one another. Each cat occupies an area that is loosely delineated by the boundaries of its neighbors' home ranges. It is critical that the species space itself so as to assure each animal an adequate and renewable supply of rabbits, mice and other small game to feed upon. Its inherent avoidance of kind also spares the animal the risky need to do combat to protect its land claim. Each cat sprays its own home range with small amounts of strong-smelling urine. Nonresident cats, seeking solitude themselves, turn away from these scent stations, while spraying their own haunts with "cat repellent."

In Florida I watched a bobcat do this. While going about the never-ending business of searching for prey, it deposited scent on conspicuous brush at frequent intervals and hardly paused to perform the act. A perfunctory "genuflect" and the selected leaf was targeted.

Conservationist Hope Ryden spent three years tracking bobcats. Her resulting book, Bobcat Year, *will be published in October by Viking Press.*

In the underbrush of Arizona's Sonora Desert, bobcat eyes two babies in a herd of small, piglike animals called peccaries. Adults closed in and the outnumbered bobcat prudently decided to retreat.

A bobcat, the female in particular, also will create visible evidence of its presence in an area by repeatedly defecating at some special, often elevated, site. That these pyramids of stools are purposeful constructions seems apparent from the fact that elsewhere the same bobcat will bury its excrement. In Idaho I found many such mounds. In every case these were located near dens where kittens had once been sheltered. Some contained scores of aging stools.

The amount of land an individual bobcat occupies varies from one part of the country to another. Bobcats in Idaho, where I spent the summer of 1978 tracking them, require considerably more space than do bobcats in Arizona, California or Florida, where I also observed the species.

In Idaho I spent time at the National Reactor Testing Station, where Theodore Bailey conducted outstanding bobcat research between 1969 and 1972. Using radio telemetry, he mapped the distribution of 17 adult cats that inhabited 250 square miles (648 square kilometers) of sage desert. One of the male cats he monitored occupied an impressive piece of this total area, its home range measuring 42 square miles (108 square kilometers). The smallest-sized polygon Bailey surveyed belonged to another male cat; it contained 2.5 square miles (6.5 square kilometers).

In central Arizona, biologist David Lawhead conducted similar research and found his study animals to be occupying significantly smaller home ranges. In Lawhead's study the average bobcat home range measured 2.68 square miles (6.94 square kilometers), not much more space than was used by Bailey's most land-deprived cat.

Other research confirms that Southern bobcats use less space than do Northern bobcats. One reason may be a greater prey density in the Sun Belt. Whatever the explanation, bobcats are most sparsely distributed across the northern states and, tragically, it is there that they are most heavily exploited. Cold climate produces thick coats, and the current vogue of long-haired "fun furs," coupled with a worldwide decline in spotted cats of many species, has created an unprece-

Given a dead rabbit to eat, a kitten is excited, but cannot bite its way through furry hide.

dented run on the North American bobcat. Pelts, which before 1970 sold at fur auctions for under $20, in 1979 brought prices as high as $650.

That a single bobcat pelt should have acquired such monetary value confounds professional trappers. The fur is inferior—weak and brittle, it sheds easily. Moreover, it does not take dye well. In the past, bobcat was used almost exclusively for trim. Ironically, it was the passage of the Endangered Species Act in 1973 and the conclusion of an international agreement to regulate trade in endangered species (CITES) that created the market for bobcat fur. Representatives from 67 nations have since signed the CITES (Convention on International Trade in Endangered Species) Treaty. As a result, the luxurious pelts of the vanishing cheetah, leopard and ocelot became unobtainable. Furriers, unhappy over the loss of these marketable materials, wasted no time finding a substitute spotted fur—the North American bobcat. Eleven matched belly skins pieced together into a full-length coat and bearing the euphemistic label, "lynx cat" or "cat lynx," began to appear in fashion salons throughout Europe and in Japan. To a lesser degree these coats have been marketed in the United States. Here, however, people have shown some reluctance to pay the prices asked for the inferior fur—$8,000 and up!

Not so abroad, where an unaccountable taste for spotted fur persists. An estimated 80 to 90 percent of the yearly bobcat "take" is exported. As a result, prices have continued to escalate, as has interest in trapping. Once the province of a few old-timers, today housewives, teen-agers and retirees are trapping for dollars—and for sport.

If the bobcat were as difficult to trap as it is to observe, all this commercial pressure would likely present no threat to the species. The animal, however, is vulnerable to a leghold trap. Whereas a coyote will react

An adult plucks away at rabbit fur, before getting to the meat. By plucking the pelt, the bobcat

Hungry but unable to eat its favorite food, the kitten simply curls up beside the carcass for a nap.

will likely avoid ingesting too much fur that could form indigestible hairballs in its stomach.

with suspicion to any strange object it comes upon, the bobcat's feline nature compels it to investigate and play with a novel object. Even cats that have suffered the trauma of finding themselves snapped fast in a steel trap do not seem to profit from the lesson. Theodore Bailey, using padded and offset traps to catch and collar his study animals, made 103 captures, but obtained only 66 different animals. Thirty-seven times he found repeaters back in his sets.

In times past, before the bobcat's pelt became so valuable, trappers often expressed annoyance over the species' propensity for getting into sets baited to catch more valuable furbearers. Today some of these trappers are wondering why they are catching so few bobcats. In Idaho, A. W. Barnes, a veteran trapper of 50 years, voiced concern:

"They're overtrapped," he told me. "The price is too big. They don't propagate like coyotes, you know."

Barnes' knowledge of animals, gained from years in the field, is squarely consistent with scientific evidence. The bobcat's reproductive rate *is* low. According to data collected in Wyoming by Douglas Crowe, a female cat produces a single litter annually. By counting placental scars in carcasses, Crowe was able to establish the average number of embryos carried per litter to be 2.8. The number of stillbirths, resorptions and spontaneous abortions is not known, and so the number of kittens actually born would be lower.

The mother's mate is no help

Moreover, the bobcat's small family size does not guarantee its young a high rate of survival. At the Archbold Biological Station in central Florida, biologist Douglas Wassmer is in the process of collecting data on a bobcat population previously monitored by another biologist, Del Guenther. In 1978 one litter of three was known. By fall, all had died. In 1979 two litters were known. By winter only one kitten was known to have survived. In 1980 four litters were known. Of these, only four kittens survived their first nine months of life.

Besides being vulnerable to traps, kittens fall victim to viral diseases, internal parasites, scabies, infections, predation by dogs, road accidents, starvation and injury. The fact that a mother bobcat, unlike a coyote or wolf, receives no help from her mate in rearing her family probably explains why such a small litter size has evolved in the species. Hunting for food requires energy, as every meal must be stalked and captured. About three kittens probably defines the limit of her capacity to successfully feed her hard-working self and keep her young nourished.

Nor are these demands on the mother cat short-lived. Until kittens are nine or ten months old, they

The shy and elusive bobcat

remain with their mother and "on the dole." At the Archbold Station, I watched a mother bobcat with three trailing adolescent kittens. Every day or so they shifted to a new location, thus giving relief to the rodent and lagomorph (hares and rabbits) population upon which they depended. At each new base, the young remained in the brush during most of the day while their mother made forays in search of food.

One evening as I was crashing through the vegetation in the wake of this stealthy hunter, I pushed aside a palmetto frond just in time to see her jump a young raccoon. In a split second she had that fierce fighter by the throat and, despite its writhing and thrashing, held it fast (p. 38). The cat calmly throttled its victim while fixing me with a steady gaze. When at last the raccoon ceased to struggle, she trotted off with it. I followed and observed how she towed the cumbersome load to a place where she had parked her young. When she delivered the food, I could hear the commotion inside the dense thicket of live oak and palmetto.

Although pouncing and stalking behavior is instinctive in young kittens, these maneuvers must be practiced. A mother bobcat, therefore, begins to deliver live mice to her young when they are a few weeks old. She carries this "training prey" in a soft mouth, then looks on with a detached air while her kittens chase and play with it.

The kittens quickly learn to anticipate and block the escape attempts of such "toys," but are slow learners when it comes to killing. Studies by German ethologist Paul Leyhausen demonstrate that in felids excitement must reach a certain intensity before the animal is able to inflict a killing bite. Human beings, viewing cat behavior in the light of human values, often condemn the animal for "tormenting" its prey. Sadism, however, plays no part in the cat's psychological makeup. The predatory performance is made up of a sequence of responses and the culminating act, the killing response, is simply not as easily released as are other components of the behavior. A good thing, too. Otherwise, litters of young bobcats might destroy one another during wild bouts of play.

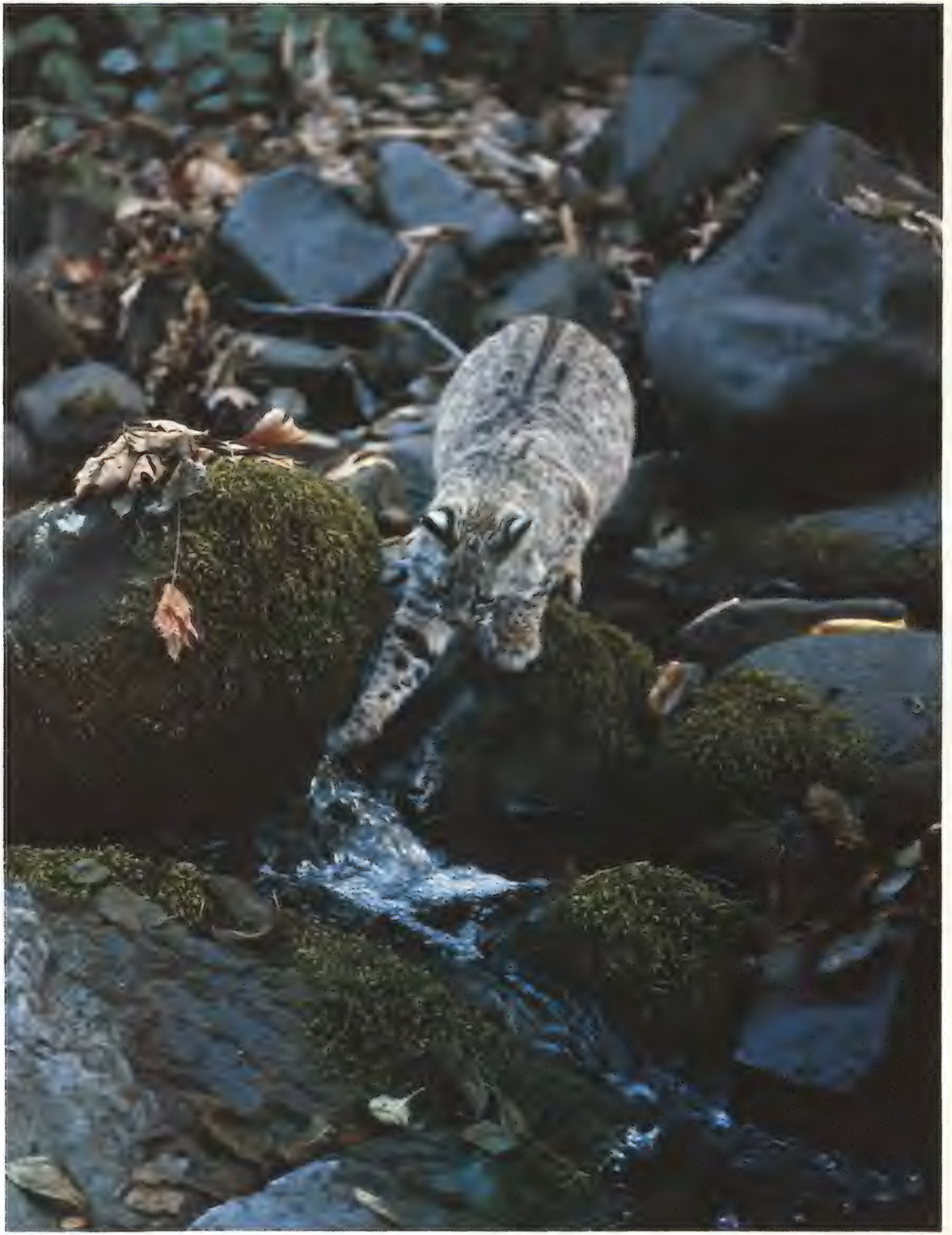
Cat-and-mouse game: a bobcat flushes a mouse from under a cholla branch in the Sonora Desert.

A scarcity of prey, a scarcity of kittens

With age and experience, of course, a wild cat learns that it must execute its victims promptly to avoid losing a meal. Half-grown bobcats nevertheless experience hunting failure and, even when food is delivered to them, they sometimes have difficulty getting at the meat. In California I watched a four-month-old kitten with a road-killed jackrabbit I dropped for it.

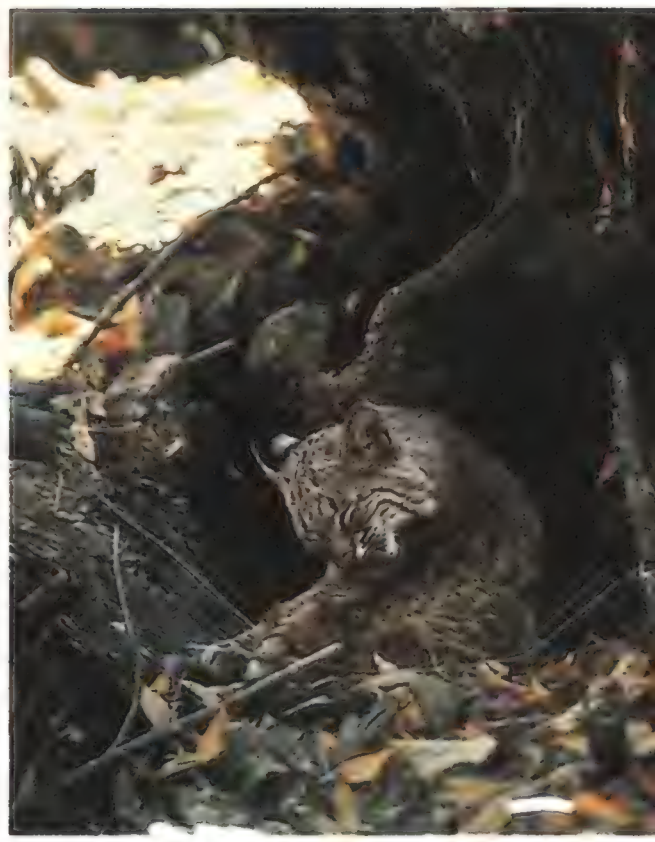
The excited kitten drooled and rolled on the carcass, but could not bite through the hide. Finally, the little bobcat curled up with the intact rabbit, clutching it like a teddy bear, and took a nap (p. 41). Later I watched an older bobcat open such a carcass. Before slicing through the hide with its sharp teeth, it plucked a wide band of fur from the victim's back.

Though a bobcat will feed on a variety of small game, a number of studies indicate that hare or rabbit is preferred, where available. And long before a kitten is able to bring down this coveted prey, its fate is linked to the cyclical fluctuations normal to rabbit populations. In 1971 Idaho's lagomorphs declined. By fall Theodore Bailey was unable to locate a single kitten in the bobcat population he was studying. His adult subjects fared better. Bailey theorized that during periods of rabbit scarcity, a mother bobcat may



A spotted bobcat fishes in a California brook. This cat's fishing technique is interesting: it lures fish to the surface by tapping water with a paw, then bats the fish to stream bank.

In California, a bobcat hones its claws on a log. Such "scratch posts" indicate cats are in the area.



At right, intently licking, an adult cleans itself. Like domestic felines, wild bobcats are fastidious.

be forced to range so far in search of prey that her own energy needs compel her to eat whatever she does catch. Her undernourished kittens soon become vulnerable to death from a variety of causes.

Unaccountably, since 1971 lagomorphs have been slow to make a comeback in Idaho. The Idaho Department of Fish and Game argues that the state's bobcat decline is as much a result of this rabbit depression as of trapping pressure. The two factors operating together could prove fatal to the bobcat population.

Recent research published in the *Journal of Wildlife Management* shows that trapping pressure can have a significant impact on a cat population. In a study of the bobcat's nearest relative, the Canada lynx, investigators Christopher J. Brand and Lloyd B. Keith demonstrated that in certain places where trapping proceeds during periods of snowshoe hare scarcity, afterward the lynx may not make a complete comeback. A few such cycles and the lynx may be exterminated from that part of its range.

In effect, this study challenges a long-standing wildlife management assumption that trapping is always "compensatory"—meaning that, where trapping is banned, other causes of death come into play to reduce the species to an equivalent level. Brand and Keith show trapping mortality may be "additive" during years when snowshoe hares are in short supply, and urge that trapping of lynx be curtailed at that time.

What has proved true for the lynx and the hare is likely to prove true for bobcats and rabbits. Little is known of how predator populations respond to the unnatural condition of being preyed upon. The bobcat's inability to adjust its litter size to compensate for "harvesting" sets it apart from certain prey species such as deer, mice and rabbits which will respond to a reduction in their overall population by producing larger numbers of offspring. That a bobcat's litter size is not similarly responsive to population changes can be deduced from placental scar counts made in four states where bobcat density differs.

Yet, in the face of these and other indications of the animal's inability to sustain heavy predation and without regard to what has befallen other species of North American wild cats, exploitation continues. Seven wild felids once existed on American soil. Today the jaguar is extinct within our borders. The ocelot, the jaguarundi and the margay are rare. The cougar or mountain lion today is regarded as viable only in a few regions of the West and, perhaps, Florida. And the lynx, whose range borders Canada, has decreased to the vanishing point in New England and Wisconsin.

While the bobcat is faring better, its range, which formerly encompassed 48 states, has been drastically reduced. Throughout wide swaths of the Midwest and the East, the animal is virtually absent. In New Jersey the bobcat is all but extinct and efforts are being made to restock it. Indiana, Iowa, Ohio and Delaware call it "endangered," while Illinois terms it "threatened." In Kentucky, Pennsylvania, Rhode Island and Maryland numbers are so low that the animal is given

total protection. In others it has partial protection.

Many other states, too, impressed by the animal's sudden worth, have elevated the species from the status of "varmint" to that of "furbearer" and now set seasons when it may be trapped. Of the states where bobcats are trapped, only nine have imposed a bag limit and none has placed a limit on licenses sold. Hence the number of licensed trappers goes up each year and between 1979 and 1980 leaped by 21 percent.

In 1977 the federal government acted to slow down the exploitation. The Endangered Species Scientific Authority (ESSA), a federal panel charged with the task of monitoring the status of species listed in the CITES treaty, announced a ban on the export of bobcat pelts. The bobcat is defined in the appendix of that international agreement not as endangered, but as likely to become so if subjected to uncontrolled international trade. The treaty stipulates that, unless evidence proves export has no harmful impact on an animal so listed, export must be prohibited.

For a brief period, it appeared that a mechanism was in place to dampen bobcat trapping. But within a few months, ESSA reversed its stand by setting generous export quotas on bobcat pelts taken from states willing to institute a tagging program. The following year, ESSA went even further, approving unlimited export for the states that had tagging programs in operation.

Some conservation groups objected, but the game departments, represented by the International Association of Fish and Wildlife Agencies (IAFWA), argued that the bobcat did not deserve to be put into the "threatened species" category. IAFWA reiterated its traditional position that authority over wildlife should reside entirely with the states.

Spread-eagle on a bed of leaves, a bobcat sleeps on its back, exposing white underbelly. This is the part of the pelt most desired for fur coats. It takes 11 such pelts for a coat.

The conflict landed in court. In 1979 Defenders of Wildlife filed suit, charging ESSA with failure to implement the CITES treaty. The Defenders argued that ESSA's data on bobcat populations, obtained from the states, failed to prove its case that export was not harming the species. Supporting ESSA in court was the Fur Conservation Institute of America, 11 private fur and trapper organizations and the state game agencies as represented by IAFWA.

Because only four days were allowed for the trial, Defenders of Wildlife was not able to present its state-by-state analysis of the bobcat situation. But Judge June Green awarded the conservation group a limited victory, ordering a total or partial ban on bobcat export from seven of the nine states whose data she did hear reviewed.

Defenders was not satisfied and took the case to a higher court. In February of 1981 (two years and perhaps a quarter of a million dead bobcats later), the U.S. Court of Appeals issued its findings. The biological standards used by ESSA to authorize bobcat exports, the court said, were "inadequate" and "should be set aside." Moreover, 26 states and the Navajo Nation were improperly dismissed from consideration at trial. The case has been remanded to the lower court with instructions to favor the protection of the animal where doubt exists.

Attorneys for the fur and trapping interests, together with IAFWA, have announced their intention of carrying the case to the U.S. Supreme Court. Meanwhile, ESSA has been superseded by the International Convention Advisory Commission; this new panel has recommended that a proposal be sent to the 67 party nations to CITES that the bobcat no longer be listed in the treaty.

Although it is not hard to understand the position taken by the trapper-fur interests, one must wonder at the reluctance of wildlife professionals to grant relief to an animal population about which so little is understood. The issue, however, is only partly a biological one. What is at stake is not just bobcats, but the authority of the state wildlife management establishment.

Traditionally, the states financed their wildlife programs exclusively through the sale of hunting, fishing and trapping licenses and a tax on ammunition. Thus whatever might have been the private views of individual employees, the fish and game agencies were asked to answer to a hunting-fishing-trapping constituency.

Gradually, however, this has been changing. A few state agencies have been accepting financial and philosophical input from "nonconsuming" nature lovers who perceive wildlife as possessing an intrinsic legitimacy, unrelated to economic profit. Other states still evaluate wildlife in terms of exploitable and non-exploitable elements (*i.e.* "harvest species," "varmints," "game animals," "depredators," "trophy species," "competitors," "furbearers," and so forth).

Meanwhile the bobcat continues to work out its private destiny in places few people visit. Only on the backs of the fashionable does it put in an appearance. Inevitably, of course, the demand for its spotted coat will pass; even buffalo robes were once popular. In the end, those scraggly hides were packed away in attic trunks, though not before the teeming herds of native beasts that had produced them were gone. The demise of the bobcat would not be so noticeable an event. Few people are privileged to see a wild bobcat.

Angered by finding illegal bobcat traps on his grazing land, an Arizona rancher hung them on fence.

On the hunt, a bobcat silently pads along Florida railroad tracks, listening for rodents in nearby brush.

By Avis Berman

Camille Pissarro: a gentle visionary of the everyday

He lived simply and he heard his paintings called 'palette scrapings,' but he taught a generation of artists how to see the world

Camille Pissarro is as essential to the history of modern painting as oxygen is to the bloodstream. A patriarch of Impressionism, he painted side-by-side with Claude Monet and Auguste Renoir at the moment they made their happy discoveries about the primacy of light. With these comrades, he joined Manet, Sisley and Degas in their rebellion against the academicians, dealers and critics upholding the system perpetuating the banal pictures of the Second Empire. Nor was Pissarro content to battle for the rights of his own generation alone. Early on, he discerned the power of Cézanne and the elegance of Seurat and offered them both his considerable support. Living into the 20th century, he remained a remarkably accessible sage to young artists.

Although certainly the equal of his fellow Impressionists, Pissarro waited far longer than Monet and Renoir for widespread appreciation and monetary success. He lived on the edge of poverty until 1892, when a retrospective exhibition in his 62nd year signaled the beginnings of comfort in his life. Then, too, his strengths were quieter. On the 150th anniversary of the artist's birth, this oversight is being corrected in a glowing exhibition of 190 of Pissarro's paintings, drawings, prints, painted fans and tiles on view at Boston's Museum of Fine Arts. The show, which has already been seen in London and Paris, will run until August 9 in Boston, sadly its only stop in this country.

The avidity of Pissarro's eye was matched only by the honesty and restless intelligence of his artistic nature. Experimenting with a succession of styles, Pis-

A classic Pissarro, solid, architectural, intimately observed, *The Hillsides of L'Hermitage, Pontoise,*

Guggenheim Museum, Justin K. Thannhauser Collection

painted about 1867, illustrates compositional influence of Corot. Pontoise was thriving market town.

sarro never stopped pursuing an original means of expression. Paul Gauguin, a former disciple, explained the kernel of Pissarro's art: "However far away the haystack may be on the hilltop, Pissarro will take the trouble to go there, walk around it and examine it."

His receptivity, his devotion to the welfare of other artists, the very qualities that endeared Pissarro to everyone who knew him, worked against his larger reputation. So did his integrity. Pissarro was the only one of the original group to participate in all eight of the Impressionist exhibitions and, once they started, to refuse to compromise by submitting to the Paris Salon, bastion of respectability. To Cézanne, he was "le père Pissarro," a figure of unimpeachable moral stature. "He is a man worth consulting," he testified, "and something like God himself."

Bald, dark-eyed, beak-nosed, his long, full beard gone prematurely white, Pissarro even looked the part of an Old Testament prophet. When he would arrive at the Café Guerbois or the Nouvelle-Athènes wrapped in his black Inverness cape, his fellow artists would greet him with an affectionate "Hail to Moses!" Regardless of his imposing appearance, Pissarro was one of the most modest men who ever loaded a brush. A lack of ostentation was central to his art as well, another reason why his subtle pastoral harmonies did not catch on as quickly as the more spectacular painting of Monet and Renoir. Pissarro understood this well. "It is only in the long run that I can expect to please," he wrote to his son Lucien in 1883, "and then only those who have a grain of indulgence; but the eye of the passerby is too hasty and sees only the surface. Whoever is in a hurry will not stop for me."

Avis Berman, a free-lance writer and critic of the arts, is at work writing an authorized history of New York's Whitney Museum of American Art.

The Climbing Path, L'Hermitage, Pontoise, painted in 1875, was in his most purely Impressionist style.

Pissarro's antecedents were exotic. A native of St. Thomas in the Virgin Islands, a holder of a Danish passport and a descendant of Sephardic Jews, the artist was the seventh of eight children born to Rachel Manzana-Pomié Petit Pissarro. As the widow of Isaac Petit and the mother of his four children, Rachel scandalized the island's Jewish community when she fell in love with Frédéric Pissarro, her late husband's nephew who had recently arrived to assist her in the family haberdashery store. The Jewish community elders pronounced the liaison incestuous and opposed the marriage. Undaunted, Rachel and Frédéric, seven years her junior, produced four sons: Joseph Gabriel Félix,

Brooklyn Museum, gift of Dikran K. Kelekian

Beginnings of Cézanne's later style can be seen in blocky shapes. They worked together in this period.

born in 1826, Moses Alfred in 1829, Jacob Camille in 1830, and Aaron Gustave in 1833. That year, the local synagogue recognized the union.

In 1841, Camille was sent to school in France to prepare for a business career. He was more interested in drawing and neglected his studies. At 17 Pissarro was recalled to St. Thomas to help keep his father's books. He hated every moment of it. He sketched the harbor at Charlotte Amalie to keep his spirits up, and on one of these forays he made friends with an industrious young painter named Fritz Melbye. Pissarro, bolstered by Melbye's talk of artistic freedom, accompanied him to Venezuela in 1852. There he spent near-

Boston Public Library

Etched self-portrait, searching and honest, was done in 1890-91, when artist was 60 years old.

ly two years drawing and painting marketplaces, peasants, and the nooks and crannies of outlying villages.

The Pissarro family moved to Paris and Camille joined them in 1855. The city he returned to was now in the dictatorial hands of Louis Napoleon. Official Second Empire art was a slick, empty formula of a style combined with an anecdotal subject. Rural scenes, unless "improved" by precious idealizations, were considered vulgar and unrefined. The use of bright color was akin to some sort of vice. Only artists who were blessed by officialdom were capable of determining what was beautiful, and the beautiful never labored in an orchard or lounged in a café. This was the France Victor Hugo had chosen to leave, where Flaubert was prosecuted for writing *Madame Bovary*. Thus the conflict between official and avant-garde art was political and social as well as esthetic. For Pissarro, whose gentle exterior held in check a passionate belief in socialist and anarchist ideas, there was no doubt as to which side he would take.

It was the work of Camille Corot that first entranced Pissarro. His landscapes of hillsides, willows and streams were based on a candor and unhurried simplicity that the younger man would soon echo. Pissarro brought some of his drawings and watercolors to Corot for criticism, and the master was receptive to their genuineness of feeling. Corot urged him to study nature, and Pissarro trudged out to the suburban woods every day. But he remained orthodox in his painting methods. He would prepare an oil sketch outside only

Mrs. Marge Scheuer

Uncommon subject for Pissarro, *Still-life: pears in a round basket*, was painted in 1872.

to rework it later onto a large, Salon-sized canvas.

Meanwhile, Frédéric and Rachel agreed to help their son, on the condition that he proceed safely and conventionally. He was to enroll in academic drawing classes and do his best to enter the Salon. In 1859 Pissarro agreed to do so.

Artistic fates were decided at the Paris Salon, the huge exhibitions held biennially until 1863 and annually after that year. The Salon was the only outlet for young painters to show their work and be deemed acceptable to collectors—if they could get in. The juries were controlled by the Academy of Fine Arts, a reactionary and despotic group. Emile Zola was to write that the Salon jury "hacks at art and offers the crowd only the mutilated corpse." It was rare indeed for a newcomer's submission to be smiled upon, but Pissarro's conventional *Landscape at Montmorency* was on the list of pictures to be exhibited at the Salon of 1859. Whistler, Manet and Fantin-Latour were rejected. In a burst of pride, Frédéric Pissarro presented his successful son with 100 francs and hung one of his pictures in the parlor. Some of that pleasure evaporated in 1860 when Pissarro announced he wanted to marry the 21-year-old kitchen maid.

With each passing year, Rachel had grown more sanctimonious and demanding. She doled out the francs and the reproaches in roughly equal amounts. Since for most of his life Camille never made a living by any activity but painting, and unpopular painting at that, he was ever dependent on his mother's goodwill and its accompanying monthly allowance. Her bounty was sorely tested by Camille's affair with Julie Vellay, a servant in the Pissarro household, and the infuriated Rachel tried to separate the pair. What she didn't count on was the decision by Camille and Julie to let nature take its robust course. Three of their eight children made their appearance before Rachel withdrew her objection to a marriage. Julie was enterprising, thrifty and devoted, and she proved herself indispensable to Pissarro. Nonetheless, 12 years passed before Rachel favored Julie with a visit.

During his early years in Paris, Pissarro continued his art classes. One studio he frequented was the Académie Suisse, which provided a model, good light and very little else. Perhaps the looseness of the setup attracted gifted students. It was there Pissarro met a handsome, impetuous painter from Le Havre named Claude Monet. Ten years younger than Pissarro, Monet was already well on his way to grasping how radically enchanting the application of pure, vital color could be. The two joined forces immediately. Later, Monet brought him together with Renoir and Alfred Sisley. In 1861 Pissarro befriended another pupil at the Académie Suisse—Paul Cézanne. He was the only one to do so. Everyone else joked about the swarthy, uncouth rustic who drew his figures so clumsily.

During these years the Pissarro family moved from Paris to the less expensive suburbs where their second child, Jeanne (Minette), was born (p. 55). Thanks to Julie, they were managing on 20 francs a week. She kept the household going by growing vegetables, raising chickens and digging potatoes for the local farmers. Still, she went unreceived while Rachel asked after the grandchildren. Pissarro no longer had to commute to his subject.

"You are a great blunderer, sir"

In 1863, having been rejected by the Salon, Pissarro, along with Manet, Cézanne and Whistler, participated in the historic Salon des Refusés. In 1866 Pissarro submitted a strong, abrupt picture called *The Banks of the Marne in Winter* to the Salon. He was reviewed by Emile Zola: "You should realize that you will please no one and that your picture will be found too bare, too black. . . . An austere and serious kind of painting . . . a rugged and strong will. You are a great blunderer, sir—you are an artist that I like."

About this time Pissarro moved to the market town of Pontoise, northwest of Paris. Using a palette knife, he completed several master landscapes, among them the architectonic *La Côte du Jallais, Pontoise* and *The Hillsides of L'Hermitage, Pontoise* (pp. 48-49). The pictures' flat colors and simple shapes were an important directive for Cézanne.

That style changed with the artist's move to Louveciennes on the Seine. Pissarro surely wanted to be near

Museum of Fine Arts, Dallas, Munger Fund Purchase

At time *Apple Picking at Eragny-sur-Epte* was painted, 1888, Pissarro was still under the influence of the much younger Seurat. But he soon departed from the Pointillist style and returned to his own vision.

Monet and Renoir, for the three began meeting at a boating resort called La Grenouillère (the frog pond). They gloried in the sparkling waters and sought to take in everything at once with broken touches and vibrant flecks of pigment. In Sir Kenneth Clark's phrase, they created a "delirium of light."

The launching of Impressionism was traumatically interrupted by the Franco-Prussian War. The Germans marched on Paris and the Pissarros fled. They received heartbreaking news in London, where they had taken refuge. The enemy used the Pissarros' house to stable their animals. For fear of dirtying their feet, the soldiers appropriated the stacks of paintings as floor matting. They also came in handy as butchers' aprons. According to Pissarro's reckoning, some 1,500 of his works, plus some oils left by Monet for safekeeping, were destroyed. Pissarro's loss of 15 years' labor, especially the paintings produced during the key year of 1869, is what customarily explains why Monet and Renoir collected most of the credit for testing the plein-air effects we cherish as Impressionism.

Yet the stay in England had its gratifying aspects. Pissarro was introduced to Paul Durand-Ruel, who was to become the Impressionists' principal dealer; and Rachel told Pissarro to marry Julie.

On his return home, first to Louveciennes and then to Pontoise, Pissarro plunged into his work with a refreshed eye for things French. His new paintings conveyed the atmosphere of a glistening spring day far more subtly and delicately than he had managed before. Durand-Ruel responded to the artist's lighter, brighter tone by buying 5,900 francs worth of paintings in 1872; he also displayed paintings by Degas, Manet, Sisley and Renoir.

County Museum of Art, Los Angeles, George Gard de Sylva Collection

In closing years of the 19th century the artist was intrigued with bird's-eye scenes of busy Paris.

La Place du Théâtre Français is one such view, as seen from his window at the Grand Hôtel du Louvre.

The friends were buoyed by prosperity and the promise of Durand-Ruel's support to defy the Salon. They agreed to sponsor their own independent exhibition without juries or prizes. When the first Impressionist exhibition opened on April 15, 1874, in photographer Félix Nadar's studio, five of Pissarro's paintings hung on the reddish-brown walls. Thirty-five hundred Parisians came to jeer at this accumulation of "palette scrapings" by Degas, Monet, Morisot, Renoir, Sisley and Cézanne. Durand-Ruel's confidence in his gamble was severely shaken. He suspended payments to his artists for the next five years.

Cézanne had been included in the exhibition by virtue of Pissarro's entreaties, although his faith in the newcomer was not universally shared. Cézanne, with his mistress and their young son, periodically joined the Pissarros in and around Pontoise between 1872 and 1882. The advance in the younger man's development was formidable. Pissarro convinced Cézanne to observe patiently from nature and apply paint via a cluster of small strokes. As early as 1865 Pissarro had eliminated blacks, browns and ochres from his palette; he persuaded Cézanne to do the same. Cézanne gave up his dark, violent fantasies of rapes and murders for prismatic landscapes, to his and art history's enormous benefit. Schoolmaster Pissarro, highly pleased, reported, "Our friend, Cézanne, raises our expectations, and I have seen and have at home a painting of remarkable vigor and power . . . he will astonish a lot of the artists who were too hasty in condemning him." Cézanne even borrowed Pissarro paintings from collectors in order to copy them and learn his instructor's techniques. Their great affinity was a natural one, because both demonstrated concern for perspective and structure. And, at the end of his life, Cézanne lost no opportunity to pay his mentor tribute. In a catalog

published in 1906, the Provençal master signed himself, "Cézanne, pupil of Pissarro."

Cézanne was by no means Pissarro's only pupil. He had a natural vocation for tutoring. Mary Cassatt recalled that Pissarro "was such a teacher that he could have taught stones to draw correctly." Paul Gauguin, stockbroker and Sunday painter, was invited to Pontoise; he, too, cleansed his palette of blacks and browns. All five of Pissarro's sons became artists, much to the despair of Julie, who knew full well the cost of being a painter's wife. Others who enjoyed the patriarch's lessons were van Gogh, Signac, Matisse and Picabia. Pissarro's dedication to initiating each new generation was a natural emanation of his generosity; he believed that all artistic discoveries belonged by rights to the entire community.

Conciliator among bickerers

Pissarro came to be unique in his devotion to cooperative activity—no easy matter. The group during the 1870s and 1880s was plagued by disastrous financial affairs as well as by internal bickering. In 1878 and 1879, for example, Pissarro spent much of his time journeying to Paris and scratching for buyers; his oils were going for 50 to 100 francs. The destitute Monet was offering his paintings in lots of 20 to pay for his dying wife's medical expenses. At various times, Pissarro complained that Cézanne was too obstinate, Sisley fatuous, and Monet and Gauguin too commercial. He remained friendly with Degas until Degas refused to exhibit with Seurat and Signac. Pissarro defended the Pointillists, thereby alienating Monet and Renoir. Then he changed his mind about following Seurat, and he and Degas were reconciled until the Dreyfus Affair (1898), when Degas became increasingly anti-Semitic. But now Monet and Renoir were speaking to him again. And Pissarro had the reputation—deserved—of being the most conciliatory member of the group. Throughout these difficult years, one quality of Impressionism became clear: the signs of poverty or emotional strain did not intrude into the art. The shimmering paintings of pink and gold celebrate harmonies that didn't exist in the artists' own lives.

In the early 1880s Pissarro's art regained a market. Durand-Ruel recovered his losses and started buying steadily again. Pissarro and his family made their final home at Eragny-sur-Epte. The children played in the stream and filled their sketchbooks with drawings and stories. Pissarro bought a printing press, for he had become a prolific graphic artist, and was made an honorary member of the local fire department.

Into this contented bourgeois Eden infiltrated the theory of Pointillism, promulgated by the cool, logical 26-year-old Georges Seurat. Pissarro was 55 when they

Wadsworth Atheneum, Hartford

Pissarro painted his daughter Minette, a frequent subject, a year before she died in 1874, aged nine.

Musée de Jeu de Paume, Paris

The Shepherdess (young peasant girl with a stick), 1881, was in seventh Impressionist exhibition.

were introduced in 1885, yet he was immediately drawn to the ideas of the younger artist. He adopted the meticulous "divisionist" stylization.

The radical change in approach met with rejection. Collectors and Durand-Ruel refused to buy the new paintings, and since some of his friends turned against him, Pissarro was in the woeful position of being isolated as well as poor once more. Pissarro reported to his son Lucien, a resident of London, that he was unable to mail his letters for lack of pennies for a stamp.

At work in Eragny, Pissarro is a patriarchal figure with flowing beard, large hat and peasant shoes.

The exhausted Julie was in such straits that she contemplated drowning herself. By 1888, however, the charm of the dot (which in Pissarro's case was actually a comma) was wearing off. "How can one combine the purity and simplicity of the dot with the fullness, suppleness, liberty, spontaneity and freshness of sensation postulated by our impressionist art?" he asked Lucien. "This is the question which preoccupies me, for the dot is meager. . . ."

Shortly thereafter, Pissarro gave up Pointillism. Yet the Neo-Impressionist interlude disciplined his execution and Pissarro sailed into the 1890s with unexpected vitality and confidence. If anything, age deepened his courage and flexibility. He accepted the return of his dealer and old comrades peaceably.

Though absorbed in the challenge of his own artistic renewal, Pissarro found time to praise Cézanne at length to a young dealer named Ambroise Vollard. In 1895 Vollard gave Cézanne his first one-man show. The avant-garde concluded that the Provençal hermit had surpassed them all, acknowledging what Pissarro had predicted so long ago. For Pissarro the acclaim—his own and Cézanne's—was just but peripheral. Years before he had declared: "When you put all your soul into a work, all that is noble in you, you cannot fail to find a kindred soul who understands you, and you do not need a host of such spirits. Is not that all an artist should wish for?" It seems that throwing himself wholeheartedly into painting was all he ever asked.

In Pissarro's old age a periodic inflammation damaged one eye seriously and there was a danger of losing the sight of the other. His disability—plus some extra money which satisfied a taste for travel—became the incentive for some of his most captivating pictures. No longer able to set up his easel in the meadows because the wind and dust irritated his eye, the 65-year-old artist of the rustic packed his bags for Rouen and Paris. There, from hotel rooms overlooking the passing scene, he painted a succession of deftly brushed cityscapes fraught with animation (p. 54). The geometrics of Rouen's harbors and great bridges and the boulevards of Baron Haussmann's Paris served as a brilliant unifying device amid the bustle of moving carriages, holiday parades, and smoke blending into mist. He put everything he knew into apprehending the color and momentum of the surging crowds below. Pissarro had only interpreted what he saw—"worm-eaten roofs," lots of gray, and Montmartre on a wet night, he said—but his hand and his eye still had the strength to make the most commonplace sights beautiful.

Pissarro painted a rare interior scene, the gouache with watercolor, of *The Market at Gisors*, in 1887.

Museum of Fine Arts, Boston

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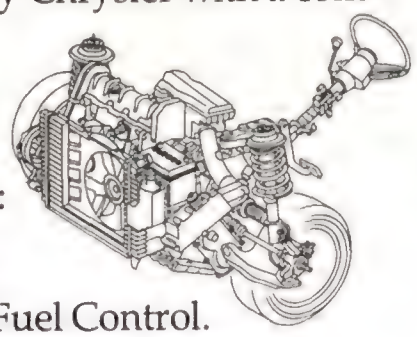

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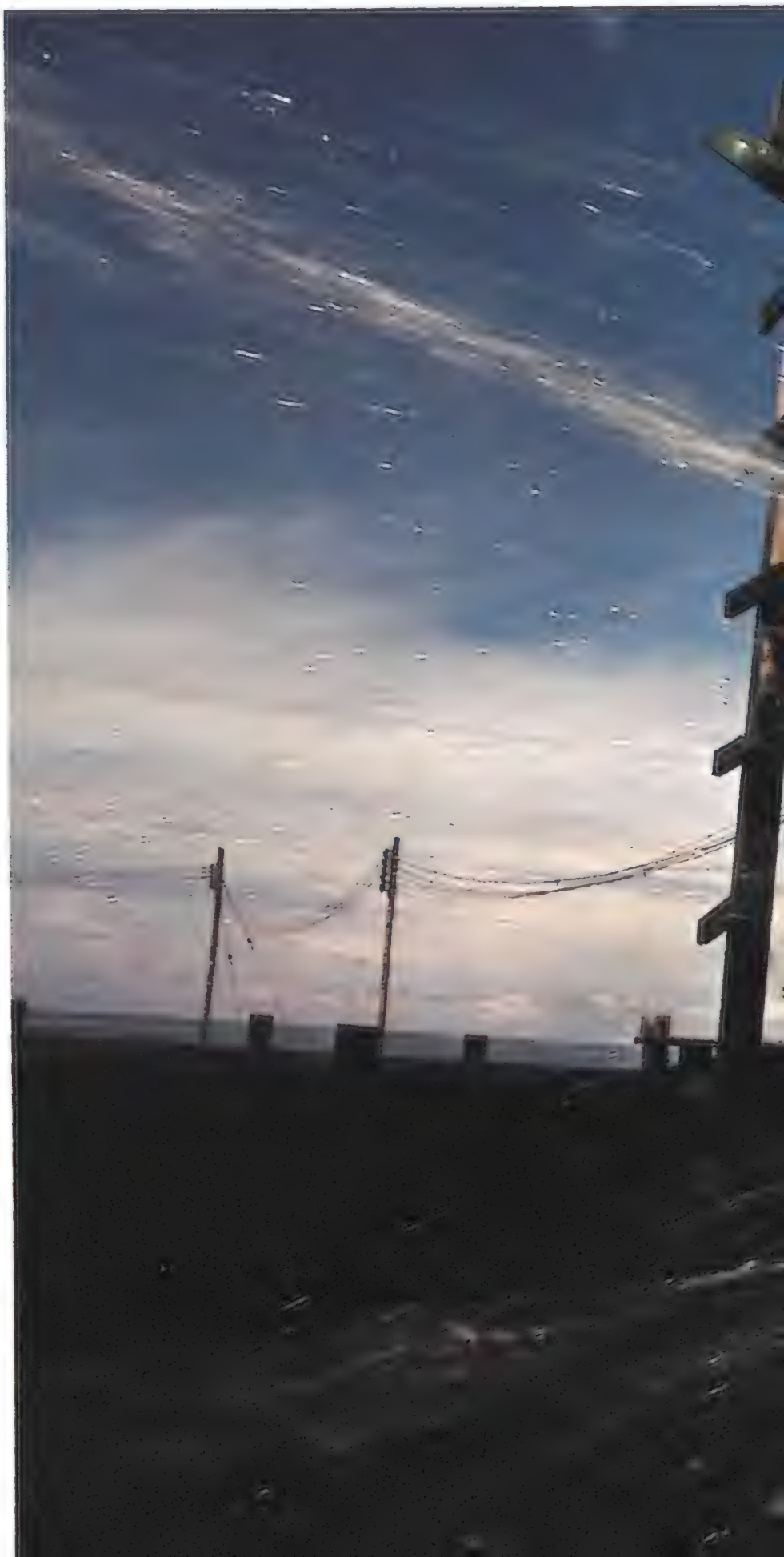
By Lewis M. Simons

From Quito to Delhi, the World Bank is more than a global money store

Enormous, powerful but also sensitive, this international development institution reaches out to help the world's poor

Beehive activities of World Bank are centered in a complex several blocks from the White House.



If you were an Indian farmer earning, say, $185 a year by growing wheat on a postage-stamp-size plot in the harsh, red earth of Rajasthan, what chance might you have of borrowing $1,200 from your local bank to put in a life-saving irrigation system?

The answer is no chance at all. If you could find a bank, it would hardly take your request seriously. Your farm, as it is, is virtually sterile. And, except for the land, you can offer the banker nothing as security.

But if your plight were shared by enough of your neighbors, and it caught the imagination of a local official, the government might eventually seek a multi-million-dollar loan from the World Bank, 10,000 miles away in Washington. A nod from this center of power would provide enough money to finance a major irrigation project, helping not just a single poor farmer, but thousands of his neighbors as well. Such a nod is given often enough. The World Bank is a busy place,

Programs worked out at headquarters are put into action throughout the world. Here, in ore-mining operation in the Philippines, workmen wash black ore off rollers at seaside location.

Eugene H. Rotberg, Vice President and Treasurer of the Bank, is in the active trading room, where he supervises international staff of managers who invest $9.7 billion of the Bank's resources.

the largest and most powerful government-to-government development institution in history. But the nods come only after the most surgical scrutiny.

Lending to help thousands or even millions is what the World Bank is all about; not savings or checking accounts, but money for world development. It is a system involving billions of dollars, more than a hundred countries and seemingly endless reports and statistics. But the bottom line is always people. In its 35 years of operation, the World Bank's $85 billion in loans for about 3,000 projects has enabled some of the world's poorest countries to help farmers like those in Rajasthan irrigate their crops, to build fertilizer plants and use new chemicals; to bring pure drinking water to peasants who had lived all their lives accepting intestinal diseases as a fact of life; to rehabilitate fetid city slums; to bring the blessings of electricity to darkened villages; to educate couples on why and how to limit the numbers of children they have; to build schools and help teachers to teach; to show mothers steeped in centuries of myth and ignorance how to care for their children better.

Although Bank lending accounts for only five to ten percent of the flow of long- and medium-term capital to developing countries, the prestige of the Bank is such that its thumbs-up or thumbs-down on a particular country or type of project has enormous influence on other prospective lenders or industrial firms. In a very real sense, the World Bank's decisions affect the economies of nations and the lives of millions.

A current example of huge scale is the Bank's entry into the field of oil and gas development and exploration. The decision to beef up its lending in these areas should ease the energy bite on many of the world's poorest nations, those whose economies have been damaged more by rocketing oil prices than by any other factor. As a start, the Bank plans loans of $1.2 billion a year by 1983 for 38 petroleum projects which, by maturity in 1990, are projected to produce 1.4 million barrels of oil a day. (For comparison, Saudi Arabia now produces 10.3 million barrels a day.)

Lewis M. Simons is a Washington Post *reporter who spent ten years as a correspondent in Asia.*

But oil exploration is only one of its development arms. Taken together, the full range of Bank projects is intended to ease the painful existence of the poorest of the world's poor, the more than 800 million people the Bank refers to as living in "absolute poverty."

To understand, you must see some of your fellow humans suffering daily on the streets of Calcutta, in the villages of Bangladesh or the parched settlements of sub-Saharan Africa. I remember the first time I saw entire families living in packing crates and storm pipes along stinking sewer canals in Djakarta. That was 1968. A decade later some still existed this way, but many had moved into little concrete-block houses built with assistance from the World Bank. A resident named Abu Jashid told me that the greatest boon was the simple cement drains that assured that human waste no longer mixed with drinking water.

It is on people like Jashid that the World Bank has turned its beacon in the last decade. Bank president Robert S. McNamara signaled the new direction in lending in a speech before the Bank's board of governors in Nairobi on September 24, 1973.

"We plan to place far greater emphasis on policies and projects which will begin to attack the problems of absolute poverty," McNamara told the board. He explained that the bulk of the 800 million poorest, those surviving on 30 cents a day, lived in the rural sections of their countries. And at that point, more than 25 years into the Bank's lifetime, less than $1 billion out of $25 billion in loans had gone to projects directly aimed at the rural poor.

A failed coffeepot theory

Until that rather dramatic moment in Nairobi, the World Bank, like most aid-giving institutions and governments, had concentrated on large-scale infrastructural projects: building hydroelectric plants, roads and railways, modernizing industry, boosting production for export. The theory most commonly held through the mid-1970s was that development of the modern sector would produce a "percolator" effect, eventually reaching the poorest.

But the economic theorists found that their plans didn't work like a coffeepot. Even though, in some cases, gross national product (GNP) rose as the rate of industrialization picked up, the plight of the subsistence farmers didn't improve. In fact, the net effect was to better the lives of relatively small numbers of city dwellers and industrial workers, as well as the wealthier landowners and big farmers.

Before moving any deeper into the complex realm of international development, let's explain the meaning of the term Third World. In politico-economic jargon, the poor nations are referred to in dizzying

Newsstand off lobby of World Bank building has many foreign magazines for multinational staff.

In typical conference, representatives from India meet with staff members to negotiate terms of a loan.

Print shop and bindery produce 20 million pages of documents and reports a month.

array as less-developed countries (LDCs), underdeveloped and developing. Collectively, they're most often called the Third World (to distinguish them from the Western-style democracies or "first world"; and the Soviet bloc, or "second world").

The 139 members of the Bank come from all three "worlds." Some principally are borrowers, others mainly donors. All members must pay a subscription, which is pegged to the country's wealth and which determines voting power in Bank decisions.

The figure Bank officials have grown used to citing as their main borrowing constituency, the two-and-a-quarter billion people of the developing world, took a quantum leap last summer when the Mainland replaced Taiwan as the one China in Bank membership, adding almost a billion people to the ranks of the poor under the Bank's wing.

Top Bank officials admit freely that it's going to be a tight squeeze. Caio Koch-Weser, formerly McNamara's personal assistant, is heading a new China division, now well into the getting-to-know-you stage as a precursor to the first loan. World Bank and Chinese officials have been exchanging visits and information to make future project planning and lending possible.

The launching of massive projects in China will be something of a throwback to the Bank's earlier years. It wasn't by accident (although hindsight reveals grave misjudgments) that the World Bank spent the first quarter-century of its existence concentrating on large-scale infrastructural projects. The founding fathers of the Bank, when they met at Bretton Woods, New Hampshire, in July 1944, while World War II was still raging, intended that the Bank would first turn to repairing war damage and then to making development loans based on sound economic policies.

Thus, the representatives of 44 nations at Bretton Woods named the new institution the International Bank for Reconstruction and Development (IBRD). Founded at the same time was the International Monetary Fund (IMF), to facilitate the freeing of international payments and international trade from restrictions. John Maynard Keynes, the acclaimed British economist, told the delegates: "It is likely, in my judgment, that the field of reconstruction from the consequences of war will mainly occupy the proposed Bank in its early days. But as soon as possible, and with

Project in Syria improves income and production of sheep, here being milked.

In Venezuela, Bank sponsored a road-building operation.

Bank financed production of power plant in Hyderabad, India.

Indonesia received $5 million credit for irrigation-system rehabilitation.

increasing emphasis as time goes on, there is a second primary duty laid upon it, namely to develop the resources and productive capacity of the world, with special reference to the less developed countries."

What Keynes and his colleagues could not have known was that one of the countries represented at Bretton Woods, the Soviet Union, would never join the Bank. Nor could the founding fathers have foreseen how rapidly the "less developed countries," mainly Western colonies, would win their independence and form a major part of the Third World.

The Bank's early policies reflected Western and particularly U.S. views. The Bank (p. 60) and the Fund are located a few blocks from the White House and the U.S. Treasury, and for years both institutions were largely "white men's clubs," with few Third World staff members. "The notion of rich countries having responsibility for the poor is a recent one; it evolved only in the post-colonial era," says Munir Benjenk, the World Bank's Vice President for External Relations.

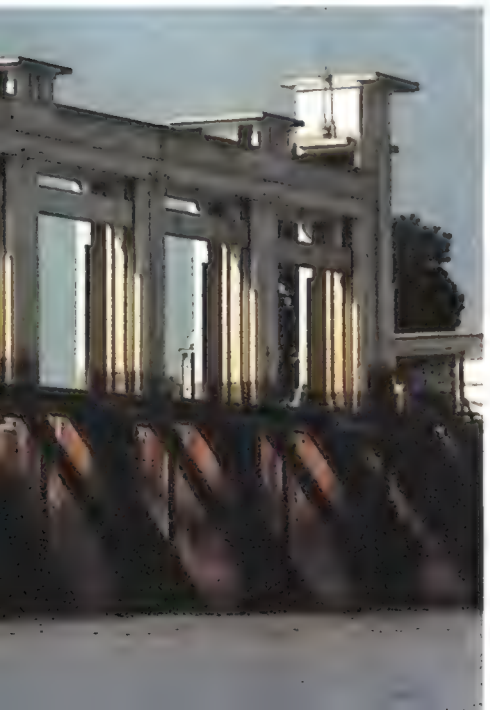
Benjenk traces present Third World militancy back to the mid-1960s and Argentina's Raúl Prebisch, whose argument at the time was clear: aid in itself is not enough; the world economic system is biased against poor nations. The first significant call for a new worldwide economic order helped spawn or strengthen the regional banks with which the World Bank now works in concert: these include the Inter-American Development Bank, the Asian Development Bank, the African Development Bank and the Caribbean Development Bank.

But some senior Bank officials say that moral appeal has by now worn thin. Americans and other Westerners question why their taxes should help countries led by self-serving demagogues.

The Bank is now beginning to use the argument that economic assistance makes economic sense. As an example, economists trot out statistics to show that more than 30 percent of U.S. exports are sold to Third World countries and that many of the industrialized countries have similar figures.

Seen from another perspective, also selfish, Western firms benefit handsomely from multilateral aid to developing countries. For example, for every dollar actually paid in by the United States to the Bank, U.S.

In Rajasthan, villagers benefit from Bank-sponsored milk cooperative.



Manikin-maker in Ecuador is aided by program for business projects.

Support came for experimental windmills at Lake Victoria.

Agronomist Daniel Ben-Or, extension agent in South Asia, converses with farmers in West Bengal.

companies receive contracts for goods and services of about ten dollars.

So far, though, the profit motive has had little impact on Capitol Hill, where appropriations are set. Since 1977, when Maryland Democrat Clarence Long took over the House subcommittee that handles the foreign aid bill, World Bankers have been skidding on the Hill. Long, an economist by training, is not an admirer of present World Bank policies. He and others who share his reservations have become thorns in the sides of those who lobby Congress for funds.

The Bank is viewed from many corners of Washington as too big and too fat. When McNamara took over 13 years ago, it had 740 professional staff members. Today, it employs 2,529 professionals and nearly as many support personnel. Nearly a fourth of the professionals are Americans.

And they're well paid, too, at least by American standards. Compensation Director R. A. Clarke said that besides the president, who receives $78,000 a year after tax, the scale for professionals ranges from $19,270 to $68,070. Bank salaries are always shown as net figures. As international civil servants, World Bank personnel from other countries do not pay U.S. income taxes on their Bank incomes. Although the Americans on the staff must pay taxes on their Bank incomes, they are reimbursed for the tax so that they take home the same amount as non-U.S. personnel. One staff member said he calculated that after taxes and other "perks" were added, he was earning nearly double his net income. Bank Vice President and Treasurer Eugene Rotberg defends the generous pay scales. "Our people are some of the most talented in the world," Rotberg says. "If they weren't working here they would be running Standard Oil. That's the level of quality that we're talking about."

Abroad, Bank representatives (called "res reps" by insiders) tend to live, as high-level diplomats frequently do, in the posher, more prepossessing houses, often with swimming pools, tennis courts and staffs of servants. But there always are some Bank personnel abroad who disdain the offerings of post-colonial pleasures and who never hesitate to get their hands dirty.

Such a person was Wolf Ladejinsky, a U.S. citizen of Russian origin, who spent eight of his 76 years working for the Bank in India. His pet projects were land reform and the famed "Green Revolution." I remember him so well, in his old age, as he was going blind, still traveling across the harsh Indian landscape. Carrying a tin of biscuits (his frail system couldn't tolerate spicy curries), he'd inspect agricultural projects and listen to farmers. Then he'd return to his compact book-lined apartment in New Delhi where he'd stay up late into the nights, hammering his views at local politicians and journalists. And he'd write a flood of reports, frequently critical, back to the Bank.

Another such man is Daniel Ben-Or (above), a gaunt and driven Israeli agronomist whose self-assigned mission is to spread his gospel of agricultural extension services throughout South and Southeast Asia. Figures like Ben-Or and Ladejinsky are legendary, larger than life, and should be granted extra weight by any critic measuring the strengths and weaknesses of the World Bank, "McNamara's Bank" as it has become known over the past 13 years.

That era is about to close. But so indelible has been McNamara's imprint that when he announced his retirement last year, to take place this month on his 65th birthday, many newspaper editorials saluted "his"

bank just as, more than a decade ago, they had pointed accusing fingers at "McNamara's war."

The inevitable comparison is a sensitive area with the blunt and seemingly aloof McNamara. When I asked him if, as has often been alleged by his critics, he had taken the Bank job and kept it so long out of a sense of penance for directing so much death and destruction in Vietnam, he snapped: "Baloney."

Several weeks later, in a more expansive mood, he elaborated: "It is, I think, the most exciting job I could conceive of that I was possibly prepared for. It deals with a very important objective—advancing the social welfare of two-and-a-quarter billion people. It puts you in an organization of extremely able people . . . they're an amazing group of people . . . and in an environment that is absolutely fascinating . . . I've said—people think I say it facetiously, I don't—I've said that apart from frustration, which doesn't occur often, I'd pay for the job. And I really mean that."

On July 1, there'll be a new man with a new style running the show at the World Bank—A. W. (Tom) Clausen (right) who, during his 11 years as head of the San Francisco-based Bank of America, quadrupled its assets to $111 billion. Besides being good at making money, Clausen comes across as a good-humored businessman who welcomes, indeed invites, the opinions of those who work for him. "I believe in the collegial approach—dialogue for resolution—rather than the Navy approach of standing on the bridge of the ship and shouting, 'Now hear this.' I try to be open, to maintain an open-door policy, to be approachable. And I make a lot of mistakes."

Present problems, future directions

Although he's kept most of his opinions on the World Bank out of public earshot, Clausen already has a reputation for decentralizing institutions—and the World Bank is highly centralized. "Here in the Bank of America," he said, "the process has been to decentralize decision making, to put it out there where we interface with our customers, get it out of San Francisco and around the world, where you get the bawdy language, the sights and smells. That appeals to me."

Does this mean that desk-bound World Bankers should start packing? "I don't know if more people in the field are needed," Clausen replied. "Too much decentralization can be like too much love."

When I asked him why he accepted the job, Clausen gave one of those "because it's there" kind of replies that people who know him say accurately reflects the man. "I'm intrigued by the challenge," he said. "I'm Norwegian—I've never walked away from a challenge."

Clausen considers his most pressing concerns at the outset of his term to be the effects of the open-ended energy crisis on the Third World, the entry of China into the Bank and the direction that future Bank expansion should take.

How does Clausen anticipate dealing with the Third World, disjointed as it is? "As a management principal," he replied, "I'll arrive; the experts are already there in motion; I'll ask and see and study and be informed on the direction and the process and, in time, there'll be a dialogue attempt through an evolutionary fashion to shape and motivate.

"Put another way," he added with what appears to be a characteristic touch, "I don't know."

What he does know is that the multigovernment-supported bank he's joining is no less an efficient money machine than the private enterprise he's just left. Despite the World Bank's aim to help the poor, it is not an institution based on charity, as many think, but a highly successful, conservatively managed, capitalistic institution. Most of its money is borrowed, some comes from the sale of bonds, and some 10 percent is provided by member countries, the United States being the largest subscriber, contributing $719 million of the Bank's $37.5 billion of resources.

In 1980, Congress reflected growing popular opposi-

New man in charge will be A. W. (Tom) Clausen, who comes to Bank after heading giant Bank of America.

tion to most forms of foreign aid and approved less than half of the subscription the administration sought. (Only ten percent of capital subscriptions is actually transferred to the Bank, which is free to use these funds for its operations. The remaining 90 percent has never been called into use. Rather, it serves to assure international financiers that the World Bank is a worthy borrower. Most of the funds lent to developing countries are borrowed on the open market.)

Nor has the Bank escaped the cost-cutting efforts of the new Reagan administration, which is planning to honor previous commitments to the Bank but has asked Congress to spread the payments out over several years. For the longer term, the administration intends to review future U.S. participation in the Bank—and, indeed, in all multilateral lending institutions. Many argue that bilateral aid or economic development by the private sector makes better sense.

Clausen doesn't agree. He says that while he philosophically supports the Reagan administration's efforts to reduce the size and spending level of government, cutting into U.S. support for the World Bank is not the way to do it. "I am disappointed that there is some reluctance in the administration and in Congress to support the World Bank," he says. "It is absolutely essential that the United States continue to support the World Bank just as it has done in the past. Otherwise, we are all in for some serious trouble."

By maintaining its lead position in bank funding, he added, the United States would assure world markets for itself as well as a "greater chance for world peace and a more even playing field for all the nations of the world." As to the timing of his own move into McNamara's shoes just as Bank funding faces growing unpopularity, Clausen takes it with characteristic good humor. "To see the ox gored that I've been invited to ride isn't all that easy to take," he said, adding, "and the ox is bucking harder than I'd anticipated."

Where Congressional approval is of more direct consequence is the funding of what World Bankers call their institution's "soft loan window," the International Development Association (IDA). It was established in 1960, when the Bank realized that some of its members were so poor that standard loans were driving them into ruinous debt. While the Bank lends at 9.6 percent interest over periods of 15 years or so, IDA provides concessional, interest-free "credits" to the world's poorest countries.

The bulk of Bank financing, some 90 percent, comes not from governments' contributions, but through borrowing from the wealthiest governments and commercial sources, including giant insurance companies, mutual funds and banks. In the last three years, the Bank has borrowed some $14 billion. Rotberg (p. 62), an American, oversees this borrowing—at terms guaranteed to make the average mortgagee turn green with envy in these days of double-digit interest rates. The $14 billion was picked up at 7.2 percent, "in anticipation of higher rates," Rotberg said. "We try to borrow when rates are low, not when we need it."

Although it lends for many social projects that commercial lending institutions wouldn't touch, the World Bank has a record of repayment unparalleled in the banking community: not a single loan has ever been defaulted on. Why? "We're a tougher, better and more effective lender than commercial banks," says Rotberg. "We don't reschedule loans. If a borrower is 30 days late, every country in the world is notified. If they're 60 days late, we put it in our prospectus. That places a certain subtle pressure on them." But, for obvious reasons, most borrowers maintain impeccable relations with the Bank.

Under this tough financial stewardship the Bank turns a handsome profit each year, and it's rising impressively: $238 million in 1978, $407 million in 1979 and $588 million in 1980. All profits are plowed back for use as loans or IDA credits.

Despite its fiscal responsibility, the Bank has to fight for its funds. The annual number of loans may have increased fourfold over the last dozen years, but this hardly makes a dent in some economies. For example, in India, present population 680 million and adding the equivalent of about two Switzerlands (13 million) a year, it's easy to see how all efforts to advance living standards fall short. No matter how intense a pace the World Bank sets, the crush of worldwide poverty stays elusively ahead.

Bank cartographer Yung D. Koo puts finishing touches on map showing Chinese chemical plant locations.

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The Brandy of Napoleon

Fascinating clutter of great old planes in this section of San Diego museum includes Grumman

By Edwards Park

New San Diego air museum rises from its ashes

Reborn collection gets a big lift from a daring sentimental journey to Ecuador in a grandfatherly airplane of 1942

"Duck," Army basic trainer, scaled-down German Stuka, Navy "Yellow Peril," roadable Aerobile.

Fire in a museum. The concept evokes a particular sense of tragic loss. Museums are to preserve; what irony that the preserved items often make fine tinder, especially if they happen to be aircraft. So, when the San Diego Aero-Space Museum burned on a February night in 1978, everyone involved in aviation mourned the wiping out of an entire collection, the erasure of a segment of flight history.

But this was San Diego, early home of the Ryan company that built Lindbergh's *Spirit of St. Louis*,

Museum building was erected for Ford exhibit in 1935 California Pacific International Exposition.

birthplace of naval aviation in the days when Glenn Curtiss built his seaplanes. Aircraft and pilots have held a special niche in this city since an aviation enthusiast named John Montgomery flew gliders here in the late 1880s. If ever a city was in the mood to rebuild an aircraft collection, it was San Diego.

The museum already had arranged a new building for itself when the fire roared through the old one. It has taken about three years for it to reopen with between 30 and 40 displays, depending on what's out on loan. The rebirth was marked, this spring, by what may be the last old-fashioned heroic flight. A rather primitive plane took on a flight of more than 4,000 miles over quite hazardous country. Why? Well, not for any great reason. Not to save the economy or show the Soviets what's what. Actually the flight, from San Diego to Quito, Ecuador, was a commemoration, an obsession, a grand gesture. A beau geste.

The museum stands in Balboa Park, a eucalyptus-shaded hillside that looks down on the bright crescent of the San Diego waterfront. Along the winding roads and under the trees of the park is a complex of museums and gathering places—the Reuben H. Fleet Space Theater and Science Center, a natural history museum, art galleries, gardens and perhaps the finest zoo in the country. School buses parade in and out of various parking lots. Children disembark, armed with notebooks and pencils. They are very well behaved.

"There will be no running and no shouting," says a young teacher. There isn't. "No one will leave the group," she adds. No one does.

The new Aero-Space Museum now occupies the old

Color photographs by Kenneth A. Rogers

San Diego's new air museum

"Little Looper" is a stubby-winged version of a Curtiss pusher of 1914. Pilot

Ford Building, erected for the California Pacific International Exposition of 1935. The museum people had long eyed it, and got it less than a year before the fire.

You enter the rotunda and come face to face with a superb flying replica of the *Spirit of St. Louis*. It stands on what appears as a muddy surface on a damp night: it has apparently just landed at Le Bourget in Paris, after its momentous flight. One wheel has left a curving rut to remind you that Lindbergh had to ground-loop at the end of his landing run in order to avoid chewing into the yelling throng that swarmed toward him. The open door of the cramped cabin invites you to look in. There are the gasoline lines with their valves; there's the periscope; there are the penciled notes on the dashboard. The plane is very accessible, seen like this, at ground level.

A placard tells its story: "37 people built this flying replica in San Diego between April 15 and December 6, 1978. Three of these people helped build the original *Spirit of St. Louis* in 1927. Yes it flies." And sure enough, under the engine is an oil pan to catch the slight drip from that Wright Whirlwind.

Your museum token opens the turnstile from the rotunda into the first section of the museum, a gallery of portraits of aerospace leaders, starting with Sir George Cayley, who experimented with fixed-wing gliders in the early 19th century. Some of the smaller bits of hardware connected with these figures are displayed beside them. This constitutes the International Aerospace Hall of Fame, co-users of the building.

Flight history continues chronologically as you reach the full-size displays. There is a Lilienthal glider, then a splendid reconstruction of the Wright Flyer, also depicted on the ground after one of its landings on the sands of Kitty Hawk. Its skid tracks are etched behind it, and one of the brothers is looking quizzically down as if to assess the fact that he's come to a safe stop back on Mother Earth. Again, it's effective to be so close to such a famous craft, to sense the drum-tight wing fabric, the tuned wires and tense struts.

Captain Ed McKellar, Director of the museum (he is a former Navy Blue Angel) says that simple boundary markers around the floor level displays seem enough to keep people from crawling all over them. Some boundary markers are ribbons of red neon light. "Perhaps people think they are radioactive," says McKellar. "Anyway, they work."

The collection continues unfolding the history of flight. There's the "Little Looper," a Curtiss pusher of pre-World War I which had clipped wings to make it as maneuverable as possible. In it the renowned Lincoln Beachey, first American to do the loop, kept the air show crowds in an uproar, sitting out there in the breeze with his golf hat on backward and looping again and again.

Another pusher is a First War plane, the DH-2. It was designed with the propeller mounted behind so the machine gun wouldn't clip it down to the hub during combat. But the story goes that in the heat of

Edwards Park wrote Nanette, *a book recounting his flying experiences during World War II.*

Lincoln Beachey sat out in front. This display typifies superb reproduction at museum.

one dogfight, a cartridge drum came loose and flipped away with the wind, whirling rearward right through the spinning propeller, to the pilot's discomfiture.

Only a little newer is the DH-4, "Old Number 249," built in 1916 to fly the U.S. mail. It ended its career against a mountain, and some former airmail pilots rebuilt it from the wreckage. They had no sooner finished than it burned. So this is a new reproduction, donated to the Smithsonian and lent to the museum.

You round a corner and face a stretch of museum that is packed with aircraft. This area is devoted to the Thirties, when so many pioneering flights were made, and to World War II. Here is a jumble of grand old planes—military trainers and operational planes, a German Stuka dive bomber, built by an enthusiast at seven-tenths scale, a Waterman "Aerobile," supposed to drive along a highway until the traffic got too heavy and then take off. It was first flown near San Diego and was licensed as a motorcycle.

There's also a WeeBee, built and flown here after World War II. It is so tiny that the pilot had to lie atop the fuselage, head up to see where he was going, steering with his feet. And there's a Ryan Vertijet, on loan from the Smithsonian. It's one of only a couple in existence—jet-propelled fighters that could take off straight up, like rockets, then flatten out and barrel off on their mission.

Many of the displayed planes have those moist oil pans under their engines, for they are flyable reproductions. But let not the purist cavil over that. Few people could scan these new-looking old planes, wooden spars glistening with varnish, wings agleam with aircraft dope, without appreciating the love and care that has gone into their re-creation. In aircraft buffs, such sights arouse plain old lust. It can best be assuaged by a visit (by invitation) to the basement shop where the work is done.

This being San Diego, there are no end of experienced aircraft builders and mechanics in retirement from Ryan, Convair, Rohr or the U.S. Navy who have volunteered to go back to work at the job they know and love and do it for nothing. They call themselves the Phoenix Flight Volunteers, the name referring to the bird that is supposed to have risen from the ashes.

During much of last winter the work down there was concentrated on a reconstructed Ryan Brougham B-5 of 1931—the commercial version of Lindbergh's specially built plane. It had to be rebuilt mostly from plans, with the help of the memories of a few aging volunteers who had worked at Ryan. One of these, Ed Morrow, helped build the *Spirit*. He's 82.

Why the absorption with the Ryan? The answer lies in that grand gesture, the flight to South America. A plaque in the museum rotunda notes that Theodore Gildred and his family foundation dedicate the museum to the pioneers of flight. In March 1931, Gildred, an engineer with some 200 hours flying time, set off from San Diego to Quito on a goodwill flight, a daring scheme in those days, inspired by Lindbergh's epic flight four years before. The Ryan Brougham Gildred and his copilot flew was a slow, ponderous crate, lacking most instruments and all communication. At least it had windows, not a periscope like Lindbergh's.

In his father's slipstream

After 18 days, some of them pretty hairy, Gildred finished his flight. He never flew again, but settled down to develop land and theaters in Mexico and to raise a family. He died in 1967, and for the last few years one of his sons, another Theodore, has been planning to repeat his father's flight.

Ted Gildred, 45, is also a real estate developer and shares the family taste for adventure. He has about ten times the flying hours that his father had in 1931. And he became obsessed with the thought of a 50th anniversary flight similar to the elder Gildred's down to the last detail.

"Dad chose to use a Ryan Brougham because it was new," Ted said before his flight. "At first I wondered if

Theodore Gildred flew pathfinding goodwill plane from San Diego to Quito in 1931.

it wouldn't be more authentic for me to choose a new plane of 1981 for my flight. But it would have been pointlessly easy. It wouldn't have proved anything."

So he oversaw rebuilding of the museum's Ryan and anxiously watched the calendar. As time began to run out it became obvious that the Brougham would never be able to go the distance. The museum got a chance to acquire a 1942 Stinson Reliant—a horse of a plane, lovely to look at, a truck to fly. With a newly reworked engine it looked good enough to make the trip. It was named "Ecuador II" and numbered NC 731 M, like the elder Gildred's plane: 7 for luck, 31 for the year, M for the pilot's sweetheart, Maxine, who, sure enough, became Ted Gildred's mother.

On March 13, 1981, the Stinson and the re-created Brougham rolled out on the San Diego runway at crack of dawn, just as Dad had done. And, as it was then, the day was a Friday. The two planes were to set off together down the runway, and if the Ryan felt like lifting off a foot or so, that was fine. The Stinson would continue its takeoff and head for Mexico.

At the appointed time the early morning crowd gathered, sipping coffee while Mayor Pete Wilson

Ecuadorian troops cleared a field for Gildred's Ryan Brougham, designed from Lindbergh's.

wished Ted Godspeed. All the volunteers watched to see how their old pet, the Brougham, behaved. And, alas, she let them down. On that take-off run her brakes grabbed, tilting her on her nose to bend her propeller. No one hurt, and no other damage.

The Stinson, meanwhile, accompanied by two other planes, headed off over misty Point Loma and on across Baja California. Near Hermosillo, where his father had force-landed, Ted circled and dropped a calling card. He and his party spent the first night at Mazatlán. He squeaked over the ridges into Mexico City, realizing that the Stinson didn't have as good a lifting wing as the Ryan. He also realized it had a wonky engine that had to be fixed.

The flight duplicated the one of 50 years ago in every possible way, except that the Stinson had modern radio equipment and navigational instruments—also those chase planes, which Ted reported looked mighty good. On March 31, on exactly the minute that the original goodwill flight came to a triumphal end on a hastily built Ecuadorian airfield, Ted Gildred slid Ecuador II onto the runway at Quito. End of adventure; renaissance for a marvelous flight museum.

In 1981, Ted Gildred exactly repeated his father's flight, but not in this Ryan.

Instead, Ted used this 1942 Stinson Reliant. Wing markings recall those on 1931 plane.

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HERE'S THE NEW J GENERATION

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The *Chautauqua Belle*, offering scenic cruises on the lake, is a reminder of the days when guests—including President Grant—arrived by stern-wheeler. Today most come by cars, leave them parked outside the gates.

By Albert Rosenfeld

Cultural village that blossoms every summer

Now starting its second century, Chautauqua draws 100,000 a season for lectures, music and art—and the relaxed pace of another age

Brigadoon, in the Broadway musical, is a village that springs into full-blown life for a single day once every hundred years. Chautauqua too is a village, and a very musical one, that also springs into full-blown life periodically; but it does so once a year, every year, and it stays gloriously alive all summer. And it is not a fantasy place like Brigadoon (though it has a certain dreamlike quality of its own), but a real community, located about as far as you can get from Broadway and still be in New York State.

Chautauqua has been thriving, with some crazy ups and downs, ever since its founding in 1874 as a summer encampment for Sunday School educators by two energetic visionaries—Lewis Miller, an industrialist, and the Reverend John Heyl Vincent, who later became Bishop of the Methodist Episcopal church. It has combined education, religion, culture and recreation into a unique, wide-ranging package that, at various times in its history, has been influential on a national and even an international scale. The ambitious home-reading program of the Chautauqua Library and Scientific Circle (CLSC), forerunner of all book clubs and cor-

Photographs by Jonathan Atkin

Artists, musicians, dancers are everywhere on the grounds. Classes are often conducted outdoors, while the grounds are dotted with small buildings where musicians can practice or compose with some privacy.

A cultural village that blossoms every summer

Soprano Charlene Chadwick, accompanied by the Chautauqua Chamber Music Players, sang last July.

Scholarship dancers rehearse. Chautauqua has its own opera company, 74-piece orchestra and art galleries.

respondence courses, which began in the summer of 1878, had an enormous impact on American adult education in the early part of this century, with local chautauquas and reading circles forming everywhere. By 1918, CLSC could boast an enrollment of 300,000; and, by its peak in 1940, it had a membership of 750,000, with hardly any part of the world not represented at all.

In 1875, only the second year of Chautauqua's existence, the first of seven U.S. Presidents who would visit came to share the experience—Ulysses S. Grant arrived by steamboat. By 1936, Chautauqua was still important enough for all four of the Presidential candidates to come up for major campaign speeches. President Franklin D. Roosevelt chose Chautauqua as the place to give his celebrated "I Hate War" speech. Though Chautauqua's influence and renown have waned in recent decades, it seems again to be in the midst of a modest renaissance that could make its presence felt once more in the land.

Many Chautauquans, especially among the year-round residents, aren't sure they want to give up the comfort of their relative obscurity—if the word "obscure" can be applied to a place where, on any day during the season, 6,000 people may be crowding into the amphitheater for a lecture or concert while an-

Chamber musicians play in the home of Dr. Fred R. Whaley, a Grange hall before it was a residence.

other 6,000 or more are going to the opera or theater, or taking courses (in, say, art, music, archaeology, writing, yoga or the dance), or attending philosophy seminars or literary "sidewalk sessions," or playing golf or tennis (one of the first tennis courts in the country was built at Chautauqua), or just enjoying the beach or the lake or the town or one another.

In this easygoing Victorian village—which Harvard professor Theodore Morrison once characterized as "a little city-state providing the instruments of civilization for a summer populace"—everything is at hand but nothing is compulsory. You can take what you please when the mood strikes you, and leave the rest. And the Chautauqua experience is full of unpredictabilities. You may, one day, be bored or disappointed by the performance of a celebrity (whom you may also have encountered on the beach, or waiting in line at the ice-cream pavilion), and the next day be electrified by the brilliance of some young singer or dancer you've never heard of before. One longtime Chautauquan remembers, for instance, going to an evening recital many years ago by a singer unknown to her. "The program wasn't particularly interesting but I thought, 'Well, I'll go and listen for a while anyway.' But I sat on one of those benches on the outer perimeter of the amphitheater so I could make an unobtrusive get-away. Then this woman began to sing and she was wonderful. I didn't miss a note, and I moved down closer. I didn't ever have to ask again who Jessye Norman was. It's that sort of discovery that makes me value Chautauqua even more than the superstars who come here."

With such a diversity of options, Chautauqua has frequently been cited as almost the only place the whole family can go without getting into any fights. There's something for everybody to do; for the children who are too young to do it themselves, there are children's services that will help them out with lessons in anything from handicrafts to sailing.

Summer before last, as a speaker and coordinator of Science Week, I was cleared by the guard through the gates of the Chautauqua Institution—or, rather, that fenced-in, 358.5-acre portion of it known officially as the Chautauqua Grounds, where most of the action takes place. Edging my car through the twisty, tree-shaded streets of the village where strollers and cyclists clearly had the right-of-way, I drove down to the lakefront to check into the Athenaeum Hotel. As I pulled up, I heard someone calling my name. It was Carolyn Restak, with her three little girls in tow. Her husband, Richard, a Washington neurologist and author, was also there for Science Week. "We got here early," she said, "and we've been out exploring. This is really a fantastic place. I can't understand why we've heard so little about it."

Her reaction to Chautauqua was repeated, with variations, by the other Science Week speakers—among

An actor makes up for a performance of *Fiddler on the Roof*, an opera company offering during Arts Week.

them sex researchers William Masters and Virginia Johnson, naturalist Roger Caras, and space physicist Gerard O'Neill—as well as by my own wife and daughter. No one in our group had been to Chautauqua before, and we were all pleasantly surprised—I perhaps less so because I'd had the chance to do some reading-up.

Earlier that year I had met in New York City with Chautauqua's new president, Robert Hesse, and his assistant, Marie O'Connor, who told me of their plans for a special Science Week, funded by the Edison Foundation. (One of Chautauqua's founders, Lewis Miller, was Thomas Edison's father-in-law; Edison himself had been a frequent visitor, and used to have his good friends, Henry Ford and Harvey Firestone, over to the Athenaeum for dinner.) Though I had heard about Chautauqua all my life, I admitted to some fuzziness about the details, and I was glad of the opportunity to learn more firsthand. I was already fascinated by what Bob Hesse and Marie O'Connor had told me, and even more so by the plans they outlined for a general renewal, expansion and upgrading.

What surprised me was the complete blank I drew from so many of my friends at the mention of Chautauqua, even the best informed and most sophisticated of them. For the most part, if they knew the name at all, it was in connection with the "traveling chautauquas" of the "chautauqua-type" lecture series, which were merely offshoots that had appropriated the name. But was there a real, geographical Chautauqua? Did it still exist? It did indeed, I was able to tell them, with its own opera company, its own 74-piece symphony orchestra, an impressive variety of educational programs and recreational activities that lured upwards of 100,000 customers through the gates during the nine weeks of its season.

"The funny thing," says President Hesse, "is that

Ushers present the collection during an ecumenical Sunday service for 6,000. Chautauqua began as

Clothing styles may change, but the front porch of the Athenaeum Hotel looks as it did at the turn of the century.

Now a private home, this house once was Chautauqua office of the Woman's Christian Temperance Union.

a summer training camp for Sunday School teachers, but has become increasingly nondenominational.

each one of those hundreds of thousands of people who buys a ticket at the gate—whether for the season, a week, a day or single evening performance—becomes, for the period of time he stays, a full-fledged member of a wonderfully intimate community."

From the porch of the Athenaeum, with its long rows of high-backed rocking chairs, I could see a gentle sweep of the Chautauqua Lake shoreline. A few sailboats were out. A lone water-skier whipped by. Farther out on the lake were fishermen, looking for bass, walleyed pike and muskellunge. In front of the hotel, on the long greensward sloping down toward the water, girls and boys of various ages were tossing and chasing Frisbees.

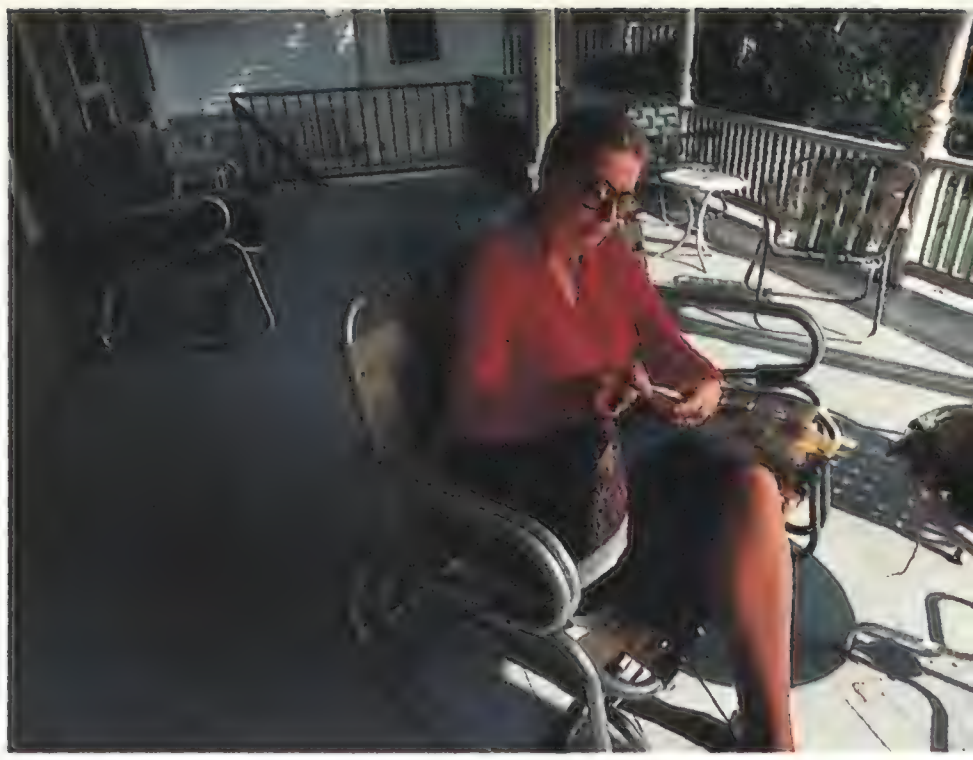
I took a stroll myself, not realizing this would be the last walk I would take in Chautauqua without being stopped all along the way for some comment or discussion. On the following morning I would make my first public appearance, just five minutes' worth, to introduce Science Week; but once you've done that, you belong to your audience. People, always pleasant and interested rather than belligerent, want you to know what they like or don't like about the program; or they may merely want to confirm, refute, clarify, ask a question, make a suggestion, contribute their own bit of information.

Not far from the hotel, the shuffleboard court was fully occupied. So was the bowling green across the road. Just a bit farther on was Palestine Park, a miniature replica of the Holy Land—somewhat rough-hewn by Disneyland standards, to be sure, but after all designed merely to serve as a visual aid in following the history and geography of the Bible.

Soon there was Miller Park and more Frisbees; and, out on the spit, the Miller Bell Tower, a major Chautauqua landmark. I wandered down steep, winding, brick lanes and across a couple of tiny wooden bridges, with luxuriant trees all but blotting out the sky. The wooden cottages, often nestling close together, were nearly all variants of the 19th-century American-Victorian (some slightly Italianate, some slightly Gothic and some Greek Revival), preponderantly vertical, multigabled, modestly ornate, and nearly all of them, it seemed, with large porches. I did get a sense of having stepped into another century—Brigadoon with telephone poles and TV antennas.

Then I came to a more open area and began to realize what a complete, self-contained community existed within this enclave—not only residences, but hotels, rooming houses, restaurants and shops of every variety; schools and dormitories, dance studios and art

Albert Rosenfeld, consultant on future programs to the March of Dimes, wrote about therapist Moshe Feldenkrais in the January 1981 issue of SMITHSONIAN.



Actress Joan Fontaine, a guest lecturer for the 1980 Autobiography/Biography Week, relaxes on a porch.

galleries, churches and clubhouses and theaters, and a Grecian-pillared Hall of Philosophy. Chautauqua has its own library, its own newspaper, post office and fire station. I walked by a band playing on a lawn. Music, in fact, was everywhere. Voices and instruments in rehearsal came from the amphitheater, from open house windows, and especially from the rows of practice shacks provided especially for the purpose.

In Bestor Plaza, around which the major shops clustered, I sat to rest for a few minutes on a bench. The woman sitting next to me told me she had been coming to Chautauqua every summer for 50 years. "I get both my body and my spirit renewed here," she explained. "I sometimes think that summer in Chautauqua is what keeps me alive and healthy through the long Ohio winter."

Her remark reminded me that, for all the quaintness and folksiness of the place, what brings people here is a real hunger for intellectual and cultural stimulation in an atmosphere congenial to its absorption. "The doctrine which Chautauqua teaches is this," said cofounder John Heyl Vincent in 1888, "that every man has a right to be all that he can be, to know all that he can know, to do all that he pleases to do."

Next morning, after the first of our lectures—Princeton's Gerard O'Neill on the prospects for orbital space colonies—I ran into Rachel Wilder, a young editor for one of the new science magazines. "Is this your first visit to Chautauqua, too?" I asked her.

She shook her head. "I've spent every summer of my life here." In fact, her father, Robert O. Wilder, owner of a small Pennsylvania steel company, was on Chautauqua's Board of Trustees. That evening the Rosenfelds and the Restaks wound up on the Wilders' porch, at the edge of Miller Park, watching the sun set on the lake and learning odds and ends about Chautauqua.

Amid the clink of ice cubes, I asked Anne Wilder, Rachel's mother, about drinking in Chautauqua. I had read that the Woman's Christian Temperance Union had been formed in nearby Fredonia, and that Chautauqua was practically its second home, so I thought the place might be bone dry. Chautauqua began as a Methodist Episcopal community with a strong temperance tradition. But it never did adopt any formal creed, and it has grown increasingly ecumenical over the years. As for alcoholic beverages, they are still officially frowned on. "You can't buy a drink," said Anne, "or, for that matter, even *drink* one in any public place. But in the privacy of your own home, nobody really objects as long as you're discreet.

"Chautauqua has relaxed in other respects, too. For instance, you're probably going to see the Cleveland Playhouse production of *Gemini* while you're here. It's a rather controversial play for Chautauqua—one of its themes is homosexuality, and in spots the language is supposed to be a bit crude, and people are wondering how Chautauqua will take it. I think Chautauqua will take it just fine," said Anne, who herself was in the midst of coproducing a Broadway play. "What's more, I'll bet you get a big turnout on Wednesday for Masters and Johnson!"

Anne Wilder was right about Masters and Johnson. They did fill the amphitheater—6,000 strong. No one else in our group drew anything like that crowd. And, typically, people stopped and spoke to them wherever they went in Chautauqua, pleased to discover that they were regular folks from the Midwest, pleasant and approachable.

We, too, enjoyed meeting other lecturers and per-

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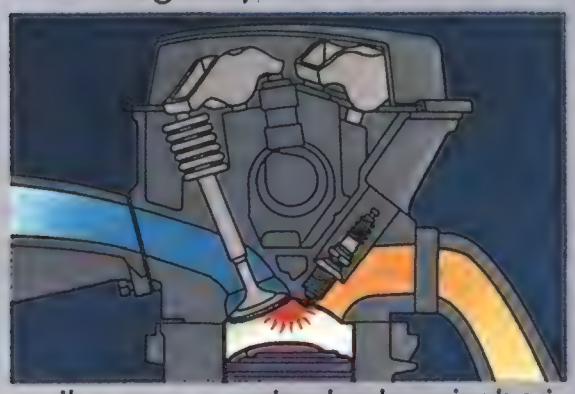

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formers, among them a couple of young actors and ballet dancers, and a theologian—the Reverend C. Charles Bachman, attached to a nearby medical center—who was giving a series of afternoon talks on ethics in the Hall of Philosophy. We went to see that controversial Albert Innaurato play (and Chautauqua did take it just fine), and we saw the opera company do Mozart's *Abduction from the Seraglio.* We could have done much more but, in the Chautauqua spirit, we decided not to be compulsive. We strolled and shopped, sunned a bit on the beach, and took a swim in the lake. We were never quite on schedule, though, to ride the *Chautauqua Belle,* the steamboat that still plies the 18-mile-long lake (p.80).

I thought, for a while, we might make it on a Friday afternoon. But I had given a talk about research on aging that morning. As a result, I was booked for an afternoon "sidewalk session" from the porch of the Chautauqua Scientific and Literary Circle—a fascinating ritual where passersby can stop as long as they please to question, comment, harangue or discuss.

I came back in 1980 to do another Science Week with a new roster. The best known of our science speakers that week was heart surgeon Michael DeBakey, who performed up to all expectations. But the surprise hit of our week was Joel Elkes, former head of psychiatry at Johns Hopkins and now at McMaster University in Canada, whose eloquence about the workings of the human brain was so spirited and humane that the audience rose for a standing ovation. "He probably doesn't know," said Bob Hesse, who was on hand to introduce every speaker, "what a rare tribute this is for an amphitheater lecturer."

For those who held season tickets, Science Week was only one of the nine special-theme weeks that ranged from Communications Week to Critical World Issues Week to Business and Economics Week. They would have seen and heard Karl Menninger and Victor Borge, the Reverend Jesse Jackson and Harvey Cox, Mel Torme and Ella Fitzgerald, Sarah Vaughan and James Roosevelt, Joan Fontaine and Mercedes McCambridge, Henry Mancini and Jean-Pierre Rampal. And of course any such list is only a partial list at Chautauqua.

Though Chautauqua was from the outset solidly based in Christianity—in particular, a Methodist-oriented Protestantism—it was never intended to be a "camp meeting" in the evangelical sense. The religious context was taken for granted, and the emphasis was always on education. Chautauqua today still retains a built-in religious orientation—but it is an independent, nondenominational and nonprofit organization whose trustees at times may be all lay people. Chautauqua has traditionally operated at a deficit—and there was one time, in the years that followed the 1929 crash, when it looked as if Chautauqua might go under. But loyal friends and supporters found ways to rescue their beloved institution. Even now, in 1981, Chautauqua—like everyone else—is feeling the inflationary pinch and is by no means financially secure. Income from tuition, tickets and gate fees covers only 70 percent of its operating costs. The rest comes from private donations and grants from foundations and corporations.

Even though cofounders Miller and Vincent worked very hard to promote and publicize their first experi-

Chautauqua Collection

James Roosevelt signs autograph for an admirer. He was guest speaker at the amphitheater lecture series.

In 1936, President Franklin Delano Roosevelt chose Chautauqua as the place to give "I Hate War" speech.

A third-generation, lifelong Chautauquan, Rebecca Snider rings the bells six times a day in season.

mental Sunday School Assembly at Fair Point on Chautauqua Lake, they were overwhelmed by the response. People poured in from 25 states as well as from the British Isles and India. The Assembly of 1874 convened for only two weeks, but such was the enthusiasm of the attendees and their determination to return that, by the second summer, they had already set up an alumni association.

Miller and Vincent clearly had large ambitions for Chautauqua. Tents gave way to cottages and an extensive building program. Schools of language and theology were set up. Any number of undertakings were tried; some worked, some didn't. Throughout the latter part of the 1880s, there was even an officially chartered Chautauqua University, authorized to grant degrees. But that was seen as premature and not quite in keeping with Chautauqua's character, so it gave way to other enterprises. Throughout its history, Chautauqua has undergone a series of transformations, some gradual, some sudden—yet managed to maintain a thread of stability and a recognizable identity through it all.

Chautauqua is not the place to go if you're looking for plush accommodations or four-star gourmet food. But it's not exactly camping out either. The facilities are serviceable and clean, and the food perfectly edible —at times downright delicious; and the Athenaeum encourages everyone to have two desserts at lunch and dinner. You won't find bars or cocktail lounges—but you might find friends who will offer you a drink. And you can always go off the grounds for a few hours as long as you don't forget your gate pass.

For the 1981 season, Varujan Kojian will take over as the musical director in full residence; he expects to be rehearsing the orchestra with greater frequency and will try to introduce into its already rich repertoire more contemporary and innovative works. There also will be a new artistic director for the opera company, Cynthia Auerbach, from the New York City Opera. Kojian and Auerbach, between them, will be looking for even more distinguished soloists as well as for new, as-yet-unheard-of talents. And all the regular features will remain in place, including the nine weeks of special-theme lecture programs. I'll be back with another week's worth of science speakers, with physicist Edward Teller as leadoff man; he'll be talking not about the H-bomb or nuclear policy, but rather about the nature of scientific enterprise. Others will tackle subjects like genetics, memory, interferon, and the beginning and end of the universe.

Unlike other superb summer places such as, say, Aspen or Tanglewood, Chautauqua is not specialized. It is not likely at any given time to be *the* best music center, or *the* best art school, or *the* best any other particular thing. But it is certainly the best Whole Package you'll find anywhere. And it is somehow not incongruous that, for all the forward-looking vigor of a new administration striving for ever greater quality and ever more impressive programs and facilities, Chautauqua manages to retain that other worldly, frozen-in-time quality.

One drifts around Chautauqua. Novelist Ken Kesey identified a quality he called "strolliness." It's easy to be talked into, say, watching a new ballerina instead of going to the opera, as you had planned; or, on a sunny afternoon, going fishing instead of doing anything cultural at all. I've already mentioned the prevalence of Frisbees at Chautauqua. For young Clinton Wilder, Rachel's brother, who is now a sports writer for a newspaper in Salem, Massachusetts, "Frisbee players represent a lot of what makes Chautauqua different from so many places and special for so many people. Like their airborne discs," he wrote in *The Chautauqua Daily,* "they are casual travelers, serious in intent, but caring less about how fast they reach their destination than what they may encounter along the way. Throwing a Frisbee on a straight line is not what the game is about."

In *Brigadoon,* the young American tourist, enchanted by the village (and, in his case, by a particular girl in it), yearns mightily to go back to it—but it isn't scheduled to reappear again for another hundred years. If you yearn to go back to Chautauqua, you only have to wait for another summer.

A scholarship music student, 23-year-old Karl Kramer, practices on the tuba behind practice shacks.

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With grunts and groans, warriors of three realms mix it up in hand-to-hand combat on the rocky desert

Photographs by Christopher Springmann

at Burro Creek, Arizona. Weapons in foreground have been blunted on the ends with foam and tape.

By Jack Fincher

They 'joust' as if knighthood were in flower today

In the odd name of 'creative anachronism,' a feisty band of lords and ladies battle and revel as in King Arthur's romantic time

His Majesty King Johann of Atenveldt—also known as John Stephan of Albuquerque—speared a piece of processed turkey and sandwiched it between two thick slices of homemade bread. With a grave bob of his brass crown he acknowledged the bows of his subjects as they sauntered down the double row of vividly colored pavilions in the desert sunshine. From somewhere came the lilting strains of a lute.

"I love this," said the brawny and bearded 26-year-old, who in the mundane world drives a beer truck. "Everywhere I go I meet someone who says, 'Oh, you're Johann. I've heard of you.' I mean, how else can a guy like me become a legend in his own lifetime?"

Not every man who would be king, of course, can be, but the Society for Creative Anachronism, Inc. gives it, forsooth, a good yeoman try. A nonprofit order of some 5,000 dues-paying members, whose collective motto might well be "Forward into the Past," the Society is currently divided into eight kingdoms in the United States and Canada. Each is ruled by a succession of monarchs who must take mock weapons in hand and battle their way onto the throne every four to six months.

"Welcome to the current Middle Ages," as one of their ballads puts it. The past they hanker for is long gone, if it ever existed: the sixth-century time of King Arthur and his Round Table, when knighthood was in flower and Merlin's magic overcame evil, when clanging swords and shattering lances brought adversaries together to contest for the love of fluttery

Where knighthood still flowers

Clashing in individual combat, two kings flail away at each other, wielding rattan broadswords.

With padded pikes and halberds raised for battle, opposing armies come together at Burro Creek.

maidens who looked on from tournament sidelines.

The Society, as it grew, grafted on a teeming network of guilds and colleges in the appropriate arts, crafts and sciences. It imbued itself, moreover, with a hierarchy of nobility and heraldry that conspires to promote the romantic concepts of chivalry, courtesy and honor to a fare-thee-well.

So much so that the resulting behavior renders a weekend like the one at Burro Creek in Arizona, despite its bristling panoply and martial intent, a study in gentle charm, lively interest and infectious good manners. Such ambience could not help but woo and win, after a fashion, even the senior citizens with their string ties and teased hair who had camped there overnight only to awaken, as if transported by time machine, to the faithfully (or fancifully) replicated accouterments of the Middle Ages.

"They're nice folks," said one leathery old man. "I didn't miss a single stick of firewood this morning."

Indeed, the lords and ladies of the Society—a curiously mixed bag of professionals, artists, scientists, teachers, students, technicians, laborers and military types, including a strange preponderance of computer

After two days of such fighting the force on left, from the Kingdom of Atenveldt, emerged victorious.

A fallen soldier—officially, but not actually, "dead"—lies where he was hit; battle rages on.

people—have moved far beyond the Society's beginnings in Berkeley a decade and a half ago when a handful of novice fighters, swaddled in protective carpet strips and muzzled in fencing masks, hacked away at each other with makeshift broadswords and maces of foam rubber, for the honor of naming the tournament Queen of Love and Beauty.

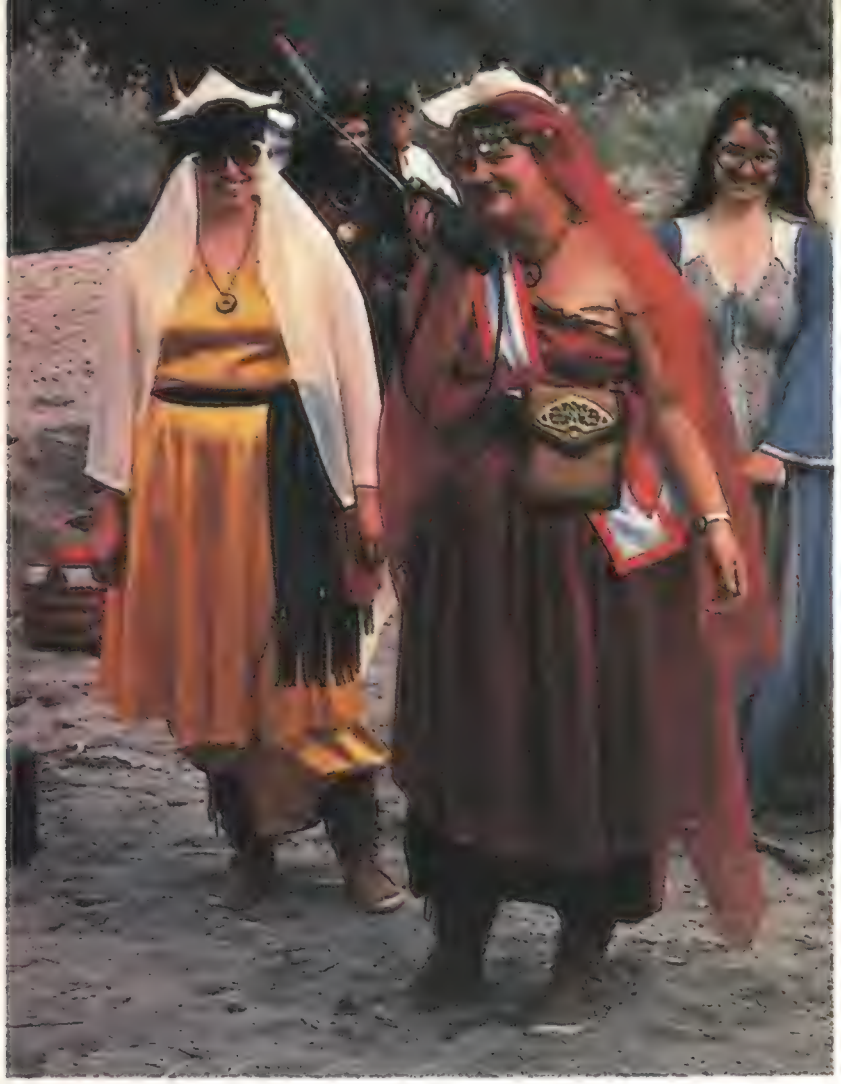
Today, for as little as ten dollars a year (which includes the cost of the local kingdom's newsletter and the Society's journal) members of either sex not only can learn the violent arts of sword and shield in sham combat, but also immerse themselves in creating the fictitious personas they wish to be—say a ninth-century Viking or a tenth-century Norman (anything up to 1600 will do)—while learning a wide range of authentic medieval skills.

Included are classes in armor-making, archery, baking, brewing, calligraphy, cooking, costuming, dance, equestrian arts, games, herbalism, jewelry-making, manuscript illumination, music, needlepoint, poetry, pavilion-making (with patterns cut from parachutes), astrology, alchemy and magic. The level of this homegrown expertise, often assiduously researched and communicated, varies, but Dr. Helmut Nickel, Curator of Arms and Armor for The Metropolitan Museum of Art in New York, calls much of it both "laudable" and "serious."

For all of that, the Society's major focus manifestly is fighting, either one-to-one or in pitched melee—what its members whimsically like to describe as "warfare between consenting adults." Though not, it must be added, without a further leavening of humor. Take the Pennsic War fought every August between hundreds of warriors from the East and Middle Kingdoms. It yearly seals the fate of the Debatable Lands, with the vanquished—like the old joke about the quiz-show winner getting a week in Philadelphia, the loser two weeks—being ceded the city of Pittsburgh.

To appreciate fully what goes on in the Society, however, requires a close look into the pageantry of Twelfth Night—in the Kingdom of the West, a sulphurous Saturday evening in January at the Marin

Jack Fincher, a free-lance writer who lives in Oregon, wrote about another kind of "army"—Salvation Army (December SMITHSONIAN).



Walkie-talkie at the ready, a Society "constable" at Burro Creek keeps spectators at a safe distance.

County Exhibition Hall in San Rafael, California. There the faithful are assembled to celebrate the coronation of Frederick of Holland and Nicorlynn of Caer Wydyr, otherwise known as Fred and Lynn Hollander, a University of California crystallographer and his gardener wife, as King and Queen of the West.

Despite leaking skies, lords and ladies of the realm have turned out by the hundreds in their most elegant finery: the men in capes, cloaks, tights, doublets and tunics; the women in jewels, flowered garlands, conical hats with veils, and a variety of stylish gowns ornately embroidered and cut to reveal a wealth of décolletage.

Indeed, there is no admission to the great hall (draped in the identifying banners of the individuals, households, shires, cantons, baronies and principalities of the Society) without donning a fitting costume. Witness the tot clad in crude lamb's wool, clutching a stuffed yellow dragon. As explained by my host, Dave Thewlis, who installs and maintains computer operating systems for a major northern California health plan: "We try to avoid a division of players and public. We get everybody into the act, which succeeds in building a much different reality."

Does it ever. My schooling begins when I thoughtlessly deny the folding chair next to me to a "Maiden Unseated," therefore "Visibly in Distress." "It belongs to a Knight," I blurt, pointing to the empty goblet left on the cushion by Duke Siegfried von Höflichkeit, né Thewlis. It ends when the Duke returns, and seeing Milady's plight, relinquishes his claim without the least rebuking me.

From a semicircle of thrones, the outgoing King of the West and his royal entourage are holding final court. Shouted volleys of "Vivat! Vivat! Vivat!" (long live!) greet a stream of visitors bent on courtly business. An emissary from Atenveldt, the Kingdom of the Sun (Rocky Mountains and Great Southwest) arrives with a gift that makes its own sly comment on the Burro Creek battle to come: a parody of the classic "bastard sword"—too big for one hand, too small for both. And, a welcome relief to the suddenly revived assembly—"court is *supposed* to be long and boring," mutters one grande dame in defense of her yawning—a notorious troupe from the Shire of Westermark (the southern San Francisco Peninsula area) marches forward beneath unfurled flags, salvos of soap bubbles and scattered candy coins (which the crowd good-naturedly hurls back) to petition for elevation to Barony: "We your bemoaning and beseeching bozos, your hapless and helpless half-pints . . . have not until now called in our chips. All speak the name Westermark in tones of reverential awe. And since we have in our possession certain etchings of the most powerful in compromising positions. . . ."

After the coronation, anachronism reigns. My hostess, Eriod of Eire, who as Deborah Bennett is working on her doctorate in comparative religion at the Graduate Theological Union in Berkeley, sips from her cow's horn not mead—wine made from honey that many members brew themselves—but chablis, while Thewlis obligingly procures a corkscrew. Later I am introduced to the Viscountess Trude Lacklandia, so named because she was without a house when she first moved east to Phoenix. A white belt around her waist and a gold chain around her neck mark her as a rare woman knight. A photocopier technician by trade, Trude fights as well with words as she does with her ersatz broadsword.

Women, too, get into the fighting

"What do I get out of it? What I put into it. I spin. I do illumination and calligraphy. I fight." She laughs. "I learned a lot about women fighting. Otherwise they wouldn't have let me."

"The powers that be said, no way," Dave Thewlis remembers the next afternoon in his living room near the U. C. Berkeley campus. "Trude said if she could find recorded instances of women fighting, would they let her? They said, sure. So she did. History, as it turns out, is replete with examples.

"Then too," and Thewlis smiles at the anachronism, "the law of the land today forbids a nonprofit organization from discriminating on the basis of sex."

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to discover!

After the battle, a fight-weary warrior gets bussed by a maiden. At above right, without removing his helmet, another fighter sips from a water bottle through a flexible plastic tube.

Over beer, cofounder Thewlis talked about the Society. "Ken de Maiffe and I—he's now a systems analyst —got interested in medievalism when we were Air Force linguists stationed in Germany during the 1960s. We'd fence in the attic of an old Luftwaffe barracks in Bremerhaven. Both of us were romantics in the classic sense, but we were always dubious about those fellows in literature who pick up a 25-pound broadsword, twirl it around their heads 50 times, then hit someone and still he stands. So when we got out and went to Berkeley, we decided to see for ourselves."

For starters they bought steel and leather and built "heaters," standard shields that look like flatirons. Sabers, épées and foils soon gave way to mock broadswords made of rattan, the flexible bamboolike wood used in wicker furniture, because, says Thewlis, "it transmits the impact of a blow all over. You end up with a glorious bruise but no broken bones."

The first tournament was held in 1966. A dozen fighters took part, armed with every remotely apropos simulated weapon back to a Roman gladiator's net and trident. The only injury: a mashed thumb suffered by a fencer who instinctively tried to block with his saber instead of his shield. Six weeks later, just prior to a second tourney that drew twice the fighters, science-fiction writer Marion Zimmer Bradley came up with the Society's catchy name. The first court was held on Twelfth Night, 1967, and from there the whole idea just took off. Knighthood was bestowed on those who excelled in combat; achievement in medieval skills as well as organization duties came to be awarded their own special honorary orders. Eventually there grew up a thriving civil service of heralds, seneschals, chatelaines, chroniclers and marshals to conduct such kingdom affairs as holding court, processing applications, publishing and monitoring the fighting to enforce requisite rules of safety and obtain liability waivers from the free-swinging participants.

Little of which, obviously, is ever allowed to intrude on a typical schedule of activities, chockablock as it is with night classes, as well as weekend wars and revels, all aimed at one guiding goal, as Society flyers put it: "the re-creation of the Middle Ages, as they were and as they might have been."

Aye, there is the rub. How reconcile a life that was

While enthroned King and Queen of the West watch, their subjects perform a country dance at a revel.

What the rich give the wealthy.

Royal Salute by Chivas. 21 year old Scotch whisky. About $50 a bottle.*

Presented in blue, green, or brown Spode china decanter, with matching velvet opera sack.

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These helmets are all based on pre-1600 designs but a single one may combine features of helmets from different periods. The art of armor-making has become a most serious craft in the Society.

actually nasty, brutish and short, to paraphrase Thomas Hobbes, with the popular contemporary touchstone that is Thomas Malory's beguiling legend of King Arthur's Round Table and a shining Camelot?

"Most who find the Society fascinating are fond of Malory, Tolkien, adventure fiction and fantasy," Thewlis concedes. "Those purely interested in historical reconstruction find us infuriating because we're not committed to accuracy when it conflicts with ideals. They feel the Society should be for serious medieval scholars, which it isn't. It's living theater."

When Thewlis learned I was going to Burro Creek, he took me down to his basement to see his armor. "The Society's first mail shirt was a 30-pound, knee-length hauberk made from coat hangers," he told me as we stopped before his workbench. "This barrel helm," he added, allowing me to heft the headpiece, "is made of ten-gauge automobile steel. A full body suit of heavy-duty plate or mail can take up to six months to make.

"The worst injury I ever saw was a broken elbow. But armor is definitely necessary," he said, turning the helm to the light. "I once saw an inch-deep dent in a helm like this, caused by a snap blow delivered like a whiplash by the little finger curled around the pommel of a rattan broadsword. Good armor and weapon techniques were not something you rushed out and advertised. They were passed down through families as precious knowledge in how to survive. Consequently we've had to invent our own—as you'll see at the Burro Creek War."

A dense heat rises from the nearly dry bed of Burro Creek as the armies of Atenveldt and of the West, augmented by forces from the southern California Kingdom of Caid, face each other across a barren stretch of sloping, rock-strewn sand. On a bridge above and behind them, dozens of spectators from the mundane world—camping tourists, passing motorists, rubbernecking townsfolk from Wickenburg, about 50 miles away—gaze down in anticipation.

Carefully and securely, rattan pikes are wrapped with foam and duct tape to blunt their points without lessening the percussive impact of their thrust. Next, on go as much as ten pounds of heavy leather welding vests, ribbed hockey gloves, thigh and hip pads, metal athletic cups. Over them are pulled 30- to 45-pound coats of armor fashioned from baling wire, auto plate or, in one prize instance, countless aluminum knockout plates from electrical panels. "It took me five hours a night for two months to make it," says Eric von Steinhaus of Cynagua, who in real life constructs tin cans on the assembly line of a Lodi, California, manufacturing plant.

Like football players testing the integrity of their shoulder pads before kickoff, they slam their armor into each other viciously, the majority of fighters from Atenveldt marked by blue-and-white surcoats, those from the West and Caid by blue-and-green braid around their helms. The rules add up roughly to this: fell your adversary, but don't hurt him. What about cheating? A portly Duke huffs in Falstaffian good humor, "You are *on your honor* to fall down dead if soundly hit, sir."

A fighter wanders around searching for a bobby pin to fasten an errant armor hinge. Nearby stands a woman fighter, Arian Rowan of Featherfin—*i.e.*, Lesley Fitzpatrick, a biologist for the U.S. Fish and Wildlife Service—nursing a broken arm suffered when whacked with a sword the previous weekend. Beside her, tucking a flaxen mane into a helmet, is Laurelyn Feagalen,

who weekdays is an Air Force airplane mechanic. Straight out of central casting for Joan of Arc, she smiles broadly when asked if the Air Force knows what she is up to: "They just think I go camping."

King Johann of Atenveldt, King Frederick of the West and King Armand of Caid meet midway between the two camps to exchange ritual accusations of an ongoing border dispute. "Your women are tanned and thin-skinned and sit in hot tubs all day long," taunts one innovative Atenveldter, an oil geologist from Denver. Spirited yells rend the dazzling desert air as both of the armies pump themselves up for the impending combat.

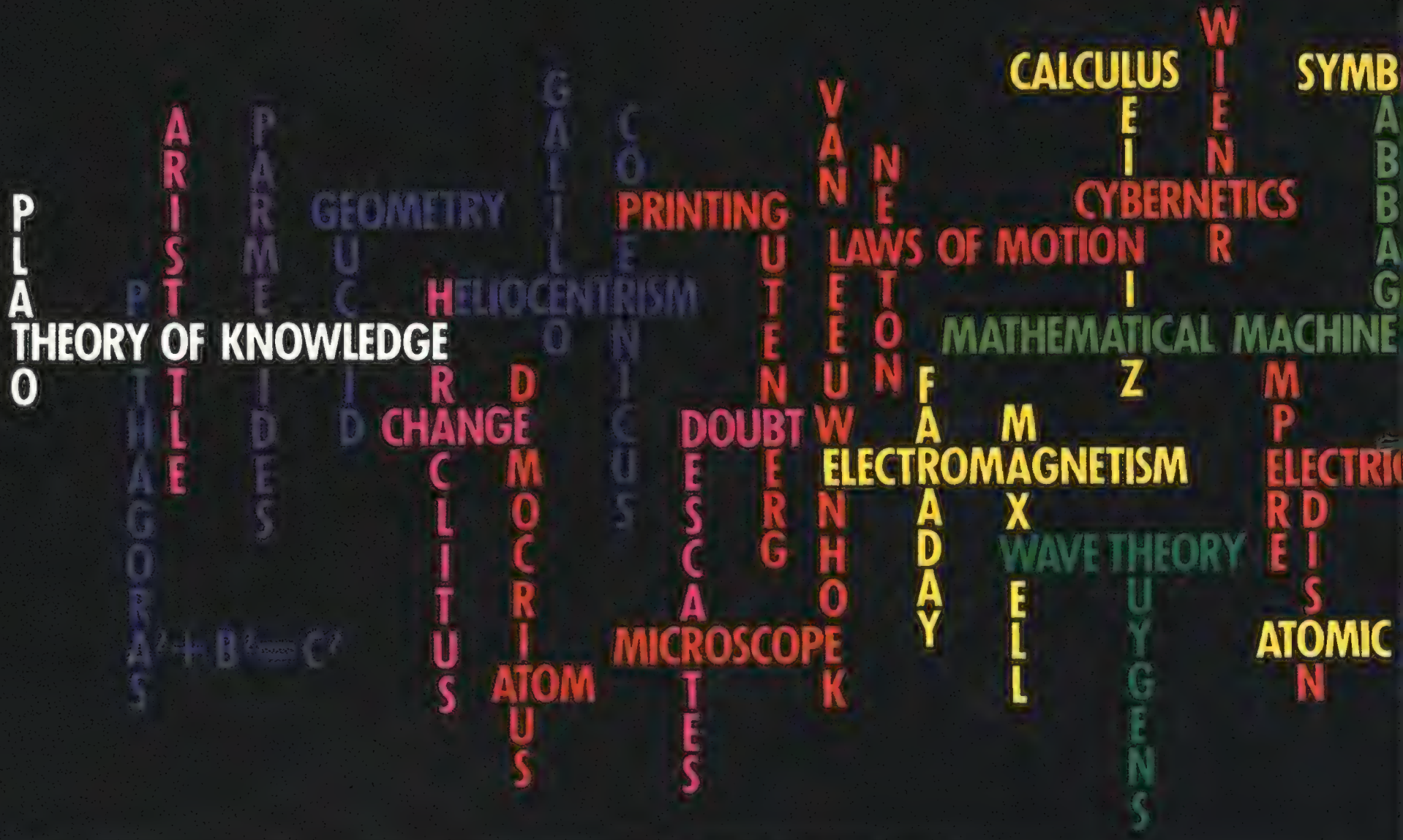
The warriors advance, screaming and chanting, beating their shields rhythmically with their swords, clinking and clanking across the burning sands as a bagpipe bleats a militant version of "Heigh-ho, Heigh-ho" from the film *Snow White and the Seven Dwarfs* to stir the blood.

With the strident alarum of "Lay on!" they come together in a fearful clashing din. In minutes the encounter is over. At the end of the two-day war, Atenveldt is the victor with a heartening minimum of real casualties on either side: a finger bloodied by a sword swing, an ankle cracked on rocks in the stream bed, a touch of heat prostration, an asthma attack brought about by a whacking good broadside to a chance opening between belt and groin.

That night campfires burn late into the starry blackness, broiling fowl, warming weary, battered bodies. Baldwin of Erebor and other bards haunt the Arizona night with bawdy Elizabethan-style ditties and Irish-sounding love laments. The mead flows, oiling tongues, loosening the stays of the mind. Why all this? you ultimately ask. Can the secret, if there is one, be anything so simple as the tacit commonality of a pell-mell escape into either the past or the future, as long as it is anywhere, anytime, but here and now?

No, they insist, nothing so simple. For there is always the anachronism. The easy match instead of the hard flint, the warm sleeping bag instead of the cold straw, the fast relief instead of the slow salvation, the edge given to fancy instead of fact. Whether forward or backward in time, the best, finally, of both worlds.

Practicing jousting skill, a knight tilts at a ring. At left is a quintain, a swinging target that can sandbag any horseman who doesn't strike it squarely with his lance and get out of the way in time.



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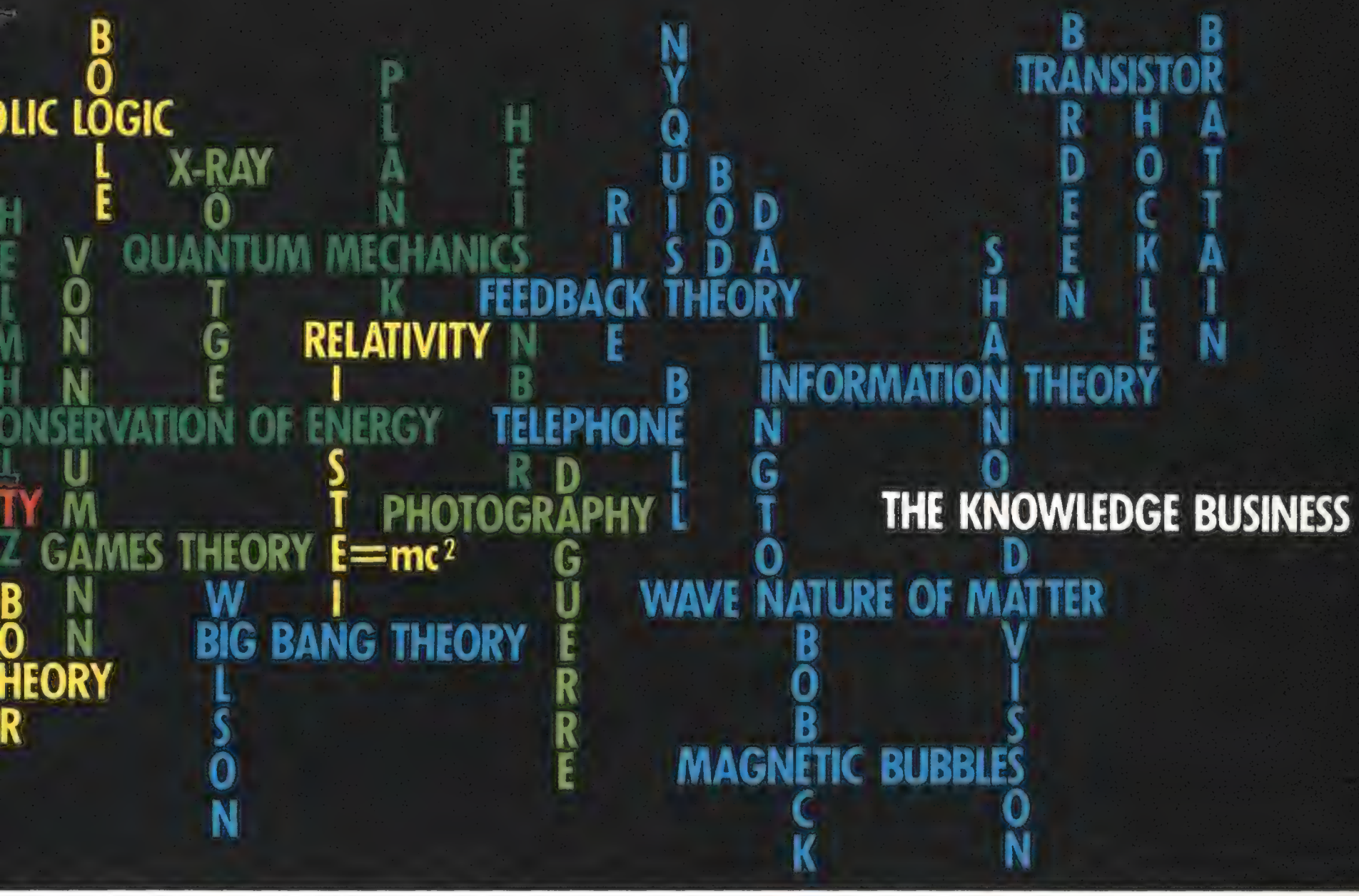

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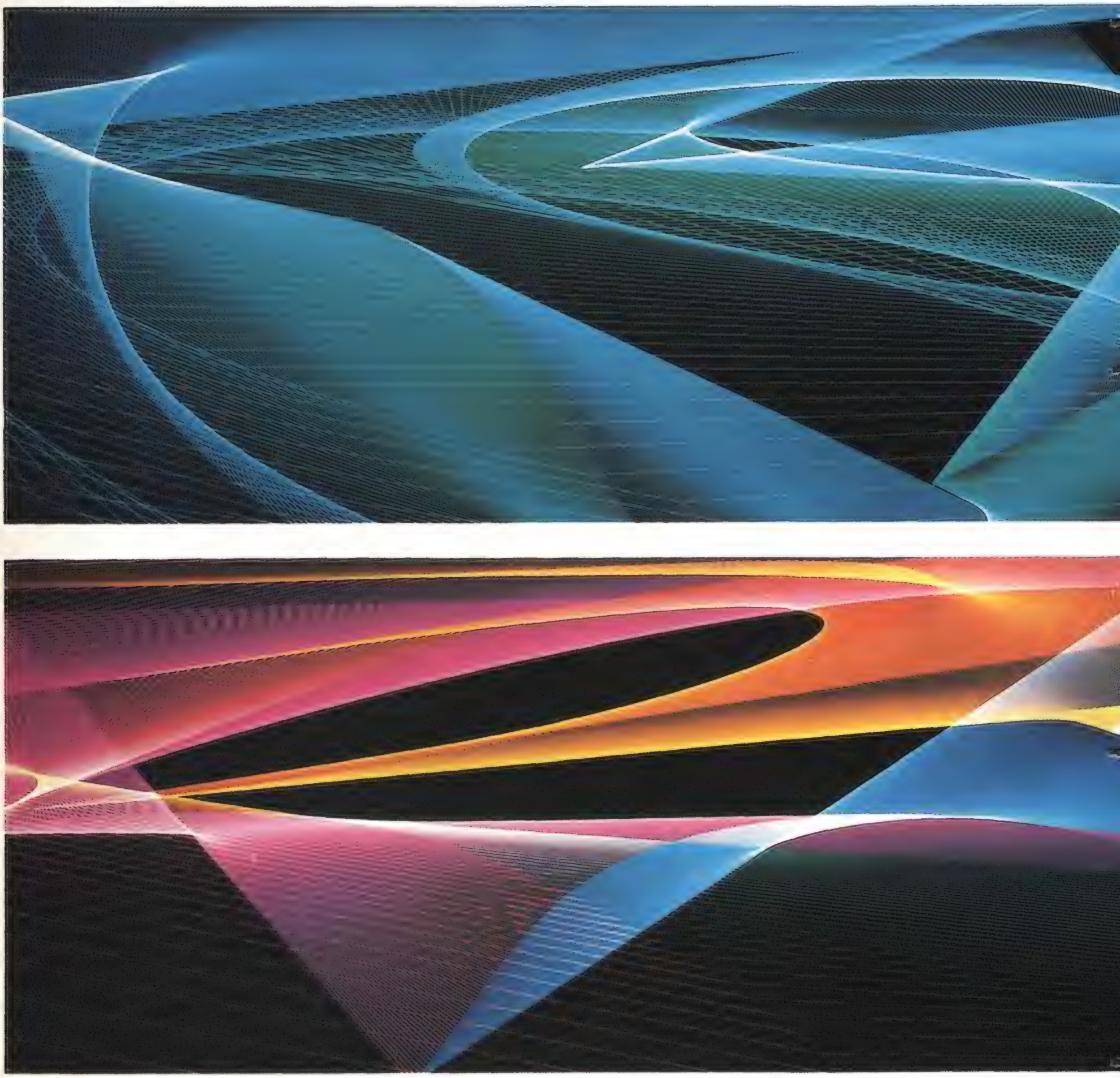
The knowledge business can help you move into the Information Age.

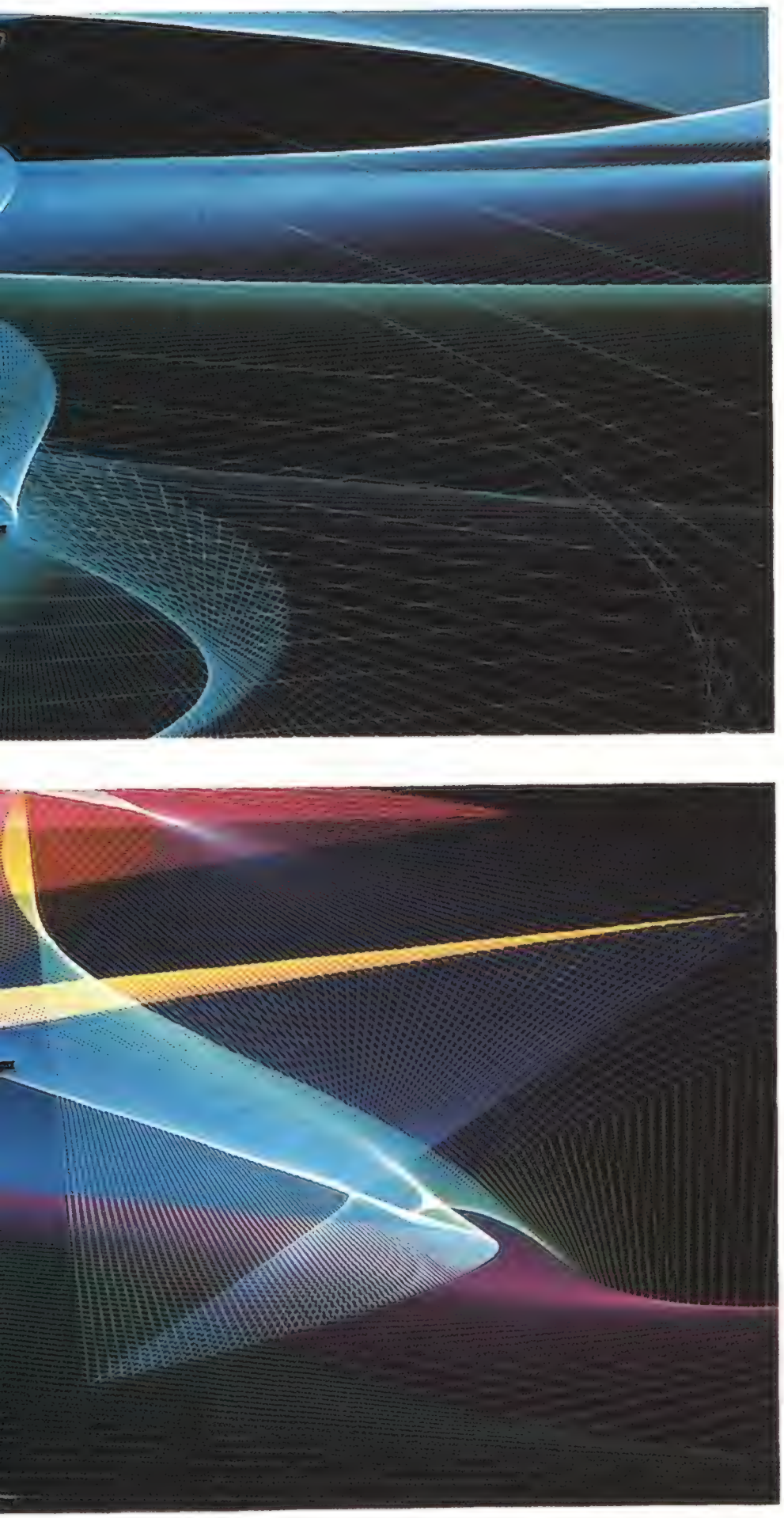
The knowledge business

By Charles R. Barnett

Computer visions can show us what the mind can imagine



Suddenly the camera lens can capture what we had never seen or never grasped; for some scientists the film has become the experiment



No one heard the thunder that shook eternity as the universe roared into existence; no one saw the searing radiation that raced from the Cosmic Seed that had held everything that ever was or ever would be. What did the Big Bang actually look and sound like? Authors and scientists have struggled to re-create an image of the event for their colleagues and the interested public. Somehow, though, words just aren't quite enough. Dramatic phrases seem to fight the triteness of their own limitations and begin to pale beside reality. While scientific notations include units of measurement flexible enough to deal with the subject, they are bland in their objectivity and fail to communicate the emotional impact of such grand events.

The Big Bang is all in a day's work for a motion-picture special-effects team. We live in a time that offers us almost daily opportunities to experience the impossible, to see the infinitesimal, to hear the inaudible. It is the world in which a lens captures what the mind alone can see.

Today's audiovisual production crews face a surge in public demand for scientific material. These crews are equipped with a whole new chest of tools with which to handle these demands, an array of equipment that would baffle a research scientist of just a few decades ago. Computer-driven cameras, lights and servomotors; lasers, tiny lens assemblies (some of them in a snorkel arrangement) are just a few of the complex instruments that have entered the world of show business. The computer itself, and the images it can produce, is the most revolutionary of all.

Whether an audience is made up of Saturday-night theatergoers in search of a few hours of diversion, or a group of PhD researchers trying to bone up on the latest developments in their field, a film serves best when it is entertaining and visually stimulating. Information is no clearer when it is dull. So, the effective scientific informational film producer often approaches science the same way that Hollywood does, through drama, good cinematography and, whenever possible, eye-catching graphics and special effects.

A crucial problem in science communication is the selection or creation of visual materials that clearly illustrate difficult concepts. Hollywood can take broad liberties as long as things look good. A science film must look good too, but the need for accuracy remains.

Most of the "old standby" tools of the science film maker have survived unchanged through the years—

In the graphics at left, the computer itself chose the forms (top) and both forms and colors (bottom) from a range of choices available to it. The programs, and in a sense the graphics, are the work of Melvin Prueitt.

slow motion, fast motion, animated artwork and so on. It is always fascinating to observe our physical world through the special vision of time-condensed or expanded cinematography, to see a bullet slowed to a dreamy unreality as it crashes through a pane of glass, launching a shower of shards and slivers in a silent air ballet. Or, at the other end of the time spectrum, to watch a seed germinate, sprout, grow and blossom with a burst of color, all in moments.

Science films fall into several broad categories. Some tell a story. It may be only the story of how laser fusion targets are fabricated, but a story nonetheless. Meant to inform a lay audience, these are the films which often resort to special effects, artwork and the other techniques of show business.

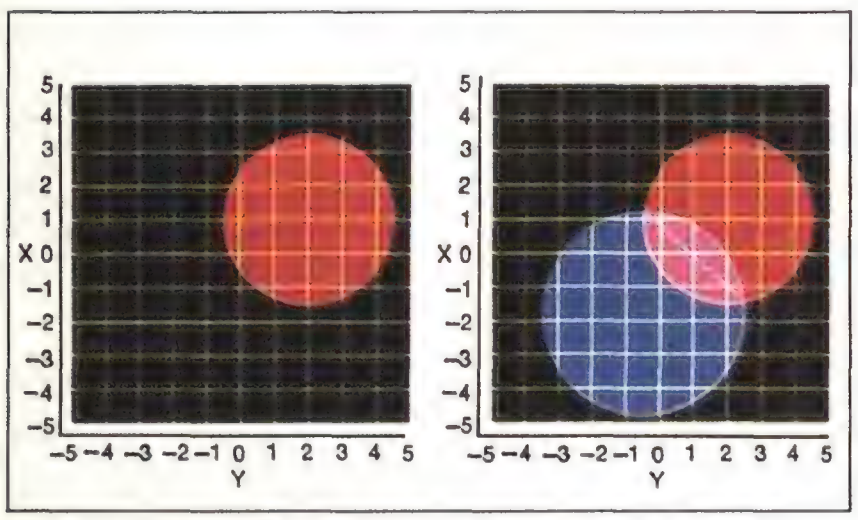
Computer motion pictures—in color and three dimensions—that let the eye instantly see the meaning of masses of data and complex relationships, are a new aid to human understanding of almost limitless power.

The dual problem in informational film production is finding attention-arresting visuals and the creating of special effects to illustrate complex scientific concepts. In computer graphics we have the potential solution to both needs. When programmed by an artistically talented mathematician, incredibly beautiful, scientifically accurate representations of reality can be achieved. To understand how it's done, let's start with the hardware. Basically, two computers are required, one of standard configuration, the other highly specialized for the production of film. Several of the latter are now on the market.

The mathematician-artist programs the regular computer to calculate the coordinates of the various forms he wishes to create and to present its results to the second computer for film generation. The second computer is a sort of Rube Goldberg affair of cameras, light sources, colored filters and computing circuitry. On commands derived from computer No. 1, computer No. 2 tells its camera to advance one frame, open its shutter, put the proper color filter in place; then it generates a dot of light on a screen. Commands flow with lightning speed as filters fly back and forth and the dot follows a patterned sequence on the screen. A picture is built up on the film emulsion. When all the colors and shapes have been completed by the dots and filters, the command goes to the camera to move on to the next frame. The process begins again, but the picture will be slightly different.

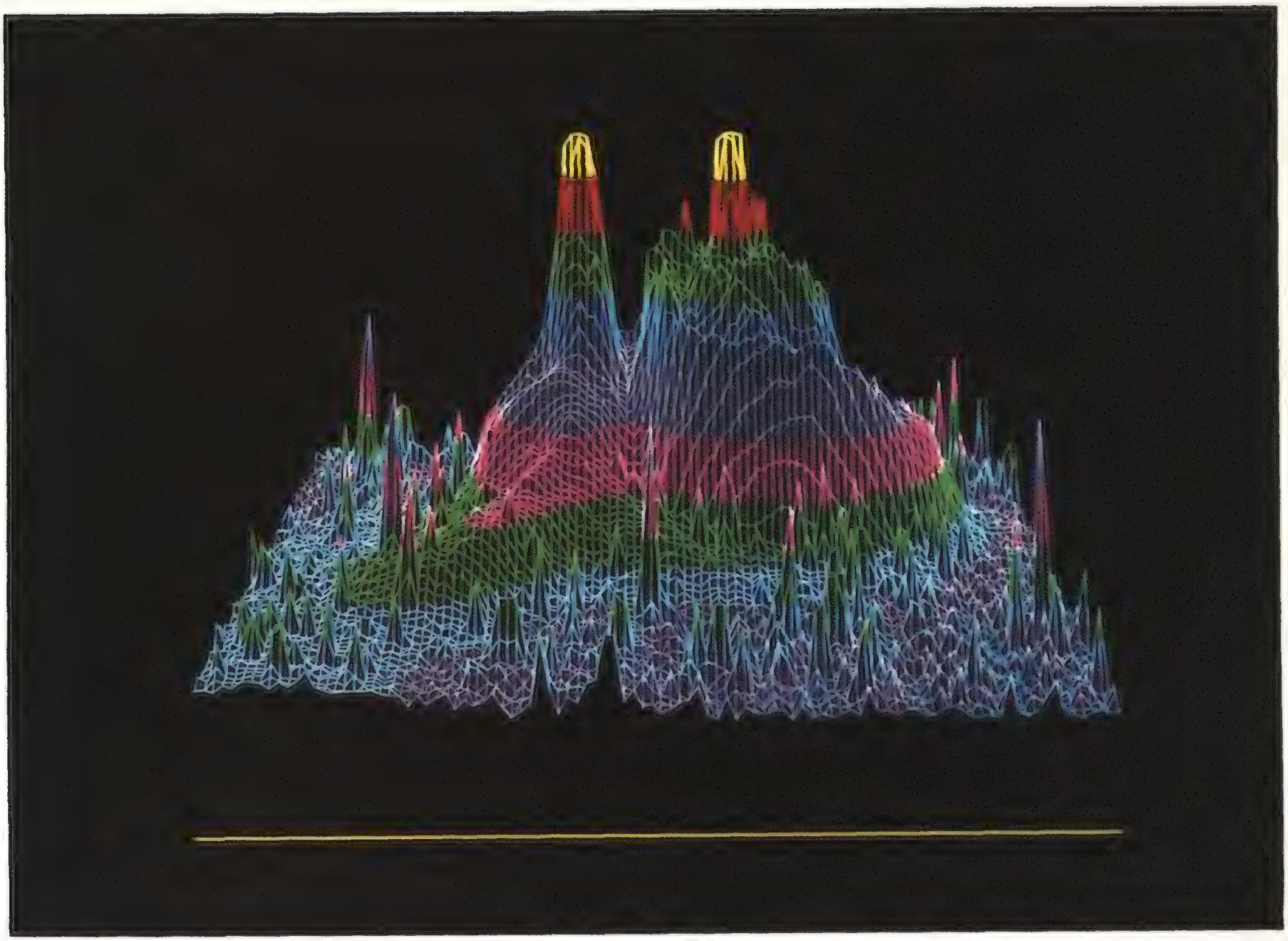
Soon there is a series of pictures, each one just a little different from the last. Develop the film and run it through a motion-picture projector at 24 frames per second, and lo and behold, Movies! And what movies! Pictures that have come, not from the world about us, but directly from the mind of the programmer, filtered slightly by the electronic maze of the computer's quicksilver brain (p.113). The computer has become a lens for the mind's eye. Never before has there been such a relationship between human and machine, each performing the function for which it is best suited. A human mind toys with concepts and forms, a computer races through millions of numbers, building pictures out of networks of interrelated coordinates.

Consider popular theories of how functions are arranged within the human brain. In general, for most people, the right hemisphere is considered adept at dealing with forms and spatial relationships. The left half controls speech but also is involved in numerical calculation and data assembly. The computer can be thought of as a machine that handles the cumbersome "left-brain" work of data manipulation with incredible speed and accuracy, then draws a picture of the



Given only numbers, computer "knows" location on grid. Circles are answers to problems posed in text.

Winner of some 35 awards, Dr. Barnett was a scientist before becoming a film maker. He heads movie and television production at Los Alamos National Lab.



Susan Bunker used both height and color to show differences in this computer plot of light intensities in the galaxy known as M-51. Information here is more easily seen than in conventional photographs.

results for that marvelous right half of the brain. A tremendous volume of data can be conveyed and understood in an instant.

Let's look at an example. The values X=2.0, Y=1.0, and R=2.5 define a geometric form and its position on a grid. On a conventional grid or graph, one horizontal line is the X axis. The value of X is the number of units along that line from the center or zero point. Numbers to the right are positive, those to the left are negative. One vertical line is the Y axis, and so the Y value is the number of units up and down that line. Here values above the zero point are positive, those below are negative. When we are given an X value and a Y value, we find the corresponding points on the X and Y axes: where lines drawn from those points, parallel to the axes, meet is the position we want.

In our example, so far, all we have is numbers. We really cannot see the figure, or where it will lie on the grid. The computer, however, instantly produces the image seen on the left side of the picture on page 108. In effect, the machine counted two units along the X axis, one up the Y axis, found where lines from those points met, and used that as the center for a figure with a radius of 2.5 units. The computer "knew" that those numbers made a circle, how big it was and where it lay on the grid. The computer can "think" in grid coordinates. We can't. We understand the drawing immediately and can even retain the image in our minds and apply it in other ways. Imagine slipping that set of equations on the ring finger of your spouse's left hand. Now that the computer has shown you what the numbers represent, you can visualize such an imaginary act, and even conjure up some wedding music to go with it if you want. But that involves more of the brain's versatility.

Here are the equations for two circles: $X = 2.0$; $Y = 1.0$; $R = 2.5$ (which is our first circle again) and $X = -0.5$, $Y = -1.8$ and $R = 3.0$. Do they cross one another? Where? And, if they do, what are the coordinates that define the line between those crossings? The

computer drew the right half of the picture on page 108. Do you even have to think now to know where that line would go?

These have been extremely simple examples of what this human-machine relationship can do so well. Thousands of pages of numbers can be reduced to a single picture and suddenly the relationships among the numbers leap out at the viewer. Color, three-dimensional perspective and motion can make clear the relationships among complex arrays of data, and not just as they exist at a single moment but also as they change through time. In the picture on page 109, both the heights of the peaks and the colors represent the intensities of light coming from different parts of a distant galaxy. Should a change occur (a supernova explosion, for example), the picture would change accordingly and the eye could immediately see how that change compared with the rest of the galaxy and with what had existed before. The limits are the limits of imagination. Pictures can be made to illustrate an infinite number of "what ifs?" And this capability nudges film into a whole new role.

Albert Einstein said a great many of his extraordinary insights into the mechanisms of the universe were simply the result of thought problems he would set himself. He posed such questions as, "What would matter look like if I were traveling near the speed of light?" Today, physicists can pose such problems in mathematical terms and see the results through computer graphics. More important from a practical point of view, scientists and engineers can run theoretical problems that deal with very real possibilities. What will happen to a reactor containment vessel if one of the coolant pipes should break? In the frames at left, we see the escaping water in blue, the explosively forming steam in yellow, and the stresses building up in the vessel itself as the situation changes from top to bottom. How does a tornado develop so much destructive power? In the picture at the top of page 112, a tornado conforming to the best available data has been created at will, and can be analyzed at leisure and in safety. What is the best aerodynamic design for a tractor trailer, the one that will require the least fuel? Instead of carving models and watching them in a wind tunnel, the computer can produce any shape and show what happens in a computer-generated wind, as on page 112. Years of trial and error can be run off in a few minutes.

Frames from computer-generated movie show changes in flow of coolant (blue) when pipe breaks inside cylinder around nuclear reactor. Steam (yellow) may show up almost anywhere in containment vessel.

Imported by the Paddington Corporation, New York, N.Y. 34 Proof © 1980

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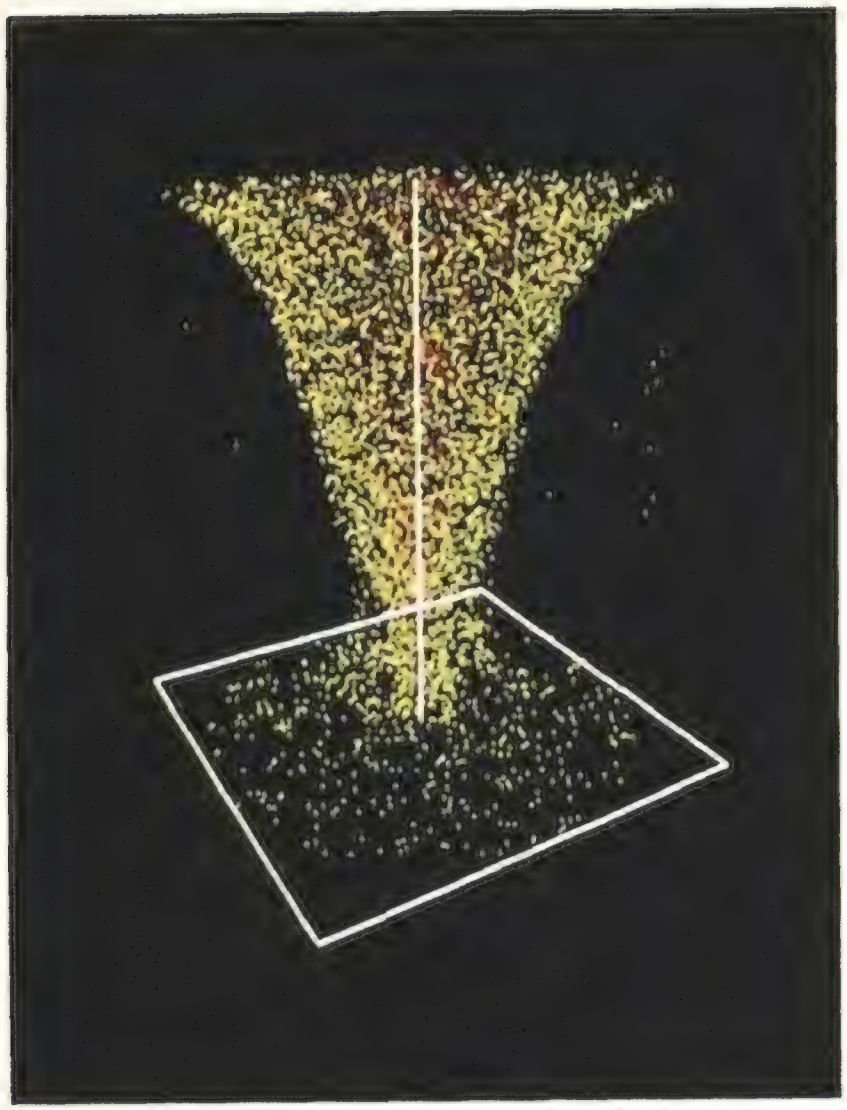
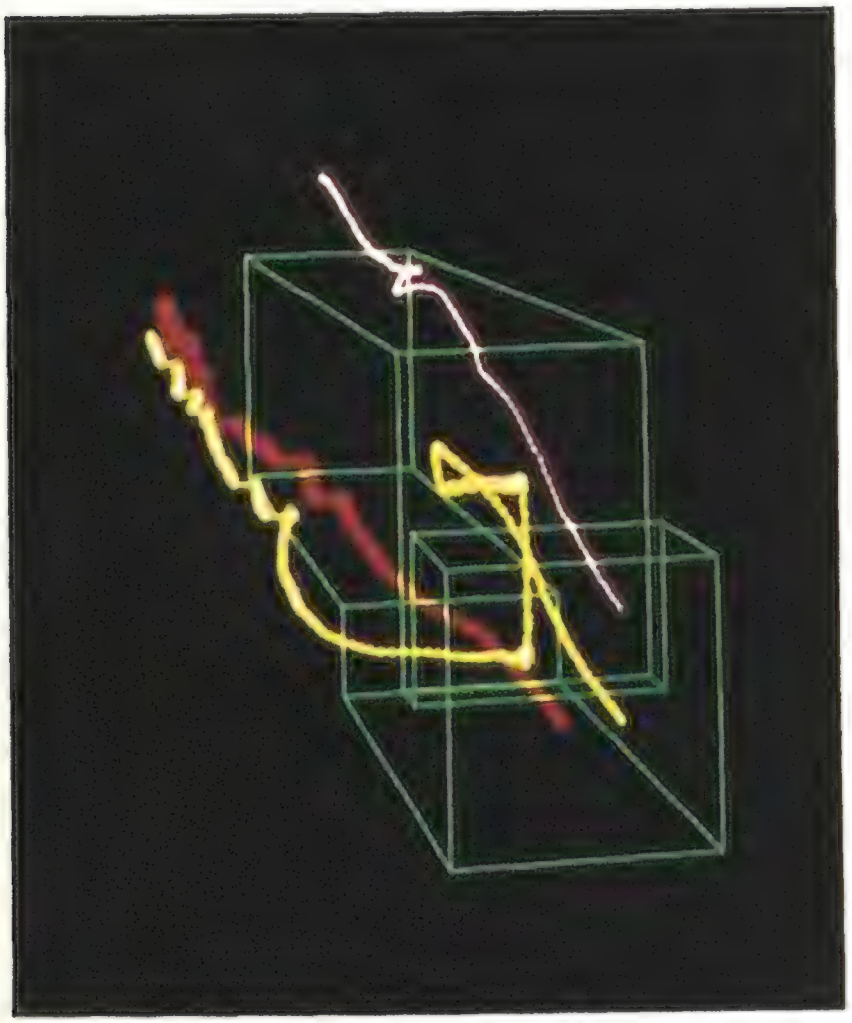


In computer reconstruction of a real tornado, an unsuspected, violent downdraft appeared (red dots).



Crooked lines in different colors show paths of air and turbulence as tractor trailer moves toward viewer.

The possibilities are virtually endless. Time can be slowed or accelerated almost infinitely in either direction as required. The smallest imaginable particle can be expanded to giant proportions or the universe shrunk to the size of a pea.

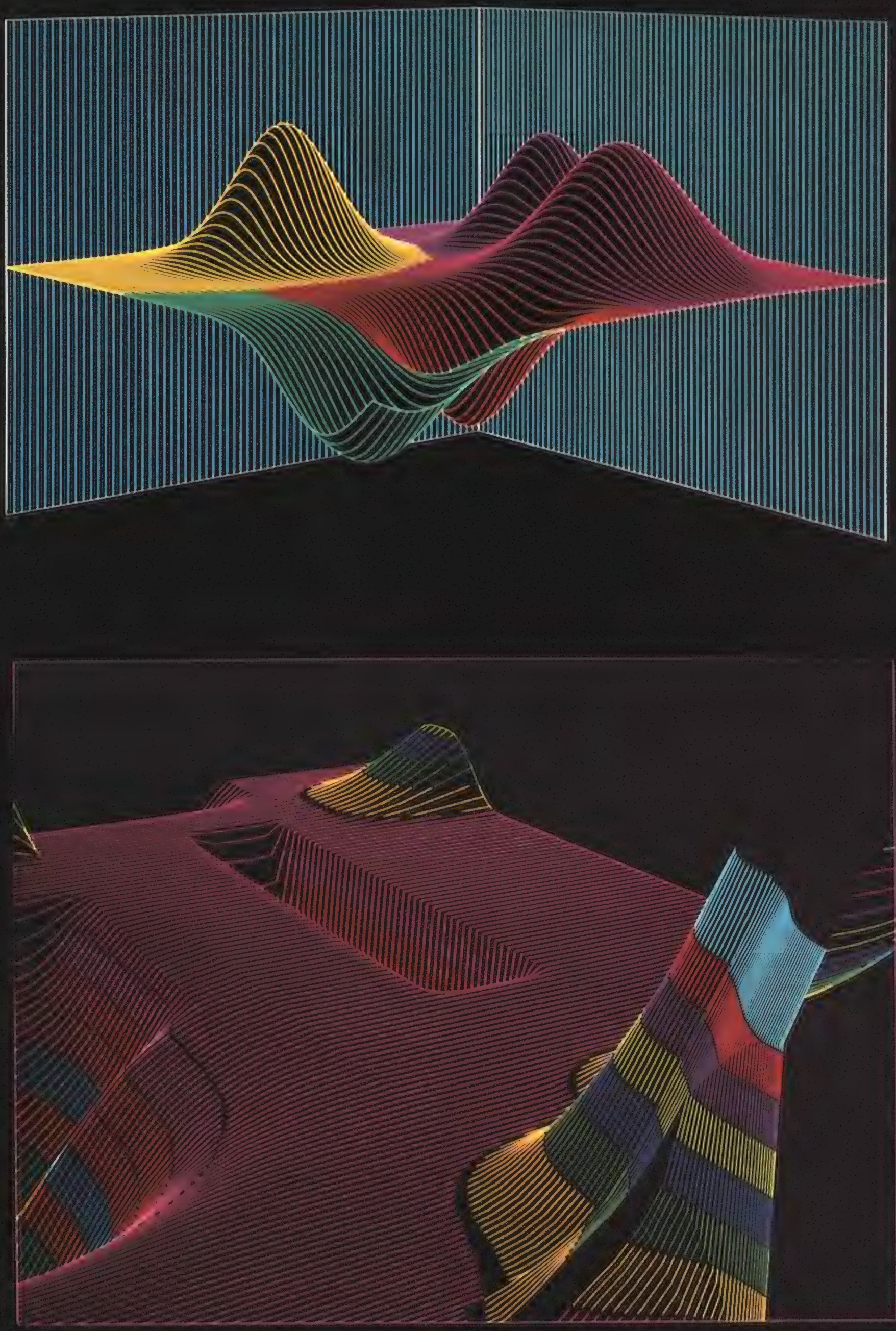
For the first time, science film is used not to record an event, or through special effects or artwork to represent an unphotographable experiment. In computer graphics work such as the reactor accident and the tornado, the film *is* the experiment. The theoretical physicists who compute these complex simulations do not call their films movies; they refer to them as calculations. They are experiments of the mind, impressively close to reality, yet so much faster, cheaper and safer to run than the real thing. Before the advent of the super computers, it might have required the lifetime of a mathematician to solve the equations necessary to simulate a tornado. Today, the job takes minutes—once sufficient data is in the computer.

There are other marvels as well. On a color video screen the experimenter can watch the calculation as it proceeds. He can see problems as they begin to happen. He can stop the computation and, with a pressure-sensitive pad and stylus, correct the calculation by changing the picture, then allow the computer to proceed. That correction might have occupied several men's lives not very long ago. To change the picture took about ten seconds. And it could have been done, after an hour's instruction, by someone who had never heard of algebra. We all have "right-brain" functions whether we study mathematics or not.

Humanity's understanding of the physical universe grows each day, and the rate at which new findings are logged in continues to increase. We are hurtling along, propelled by the still unmeasured potential of our incredible machines. Now a new dimension has been added through computer graphics. We can only anticipate a still greater acceleration in scientific comprehension. Will we become too dependent upon this rapid communication between our machines and our equally rapid right brains? Remember, it was our left brains, for the most part, that fashioned the computer in the first place.

As I was pondering this question I was asked to produce a science-information film, one to explain the uses and functions of a large computer complex. I will have to use a lot of computer graphics if I want the audience to understand what is going on.

In the plot of mathematical functions at top right, the programmer can instantly see problems or errors. Exaggerated landscape, bottom right, could aid a pilot landing in a strange place, or even on Mars.



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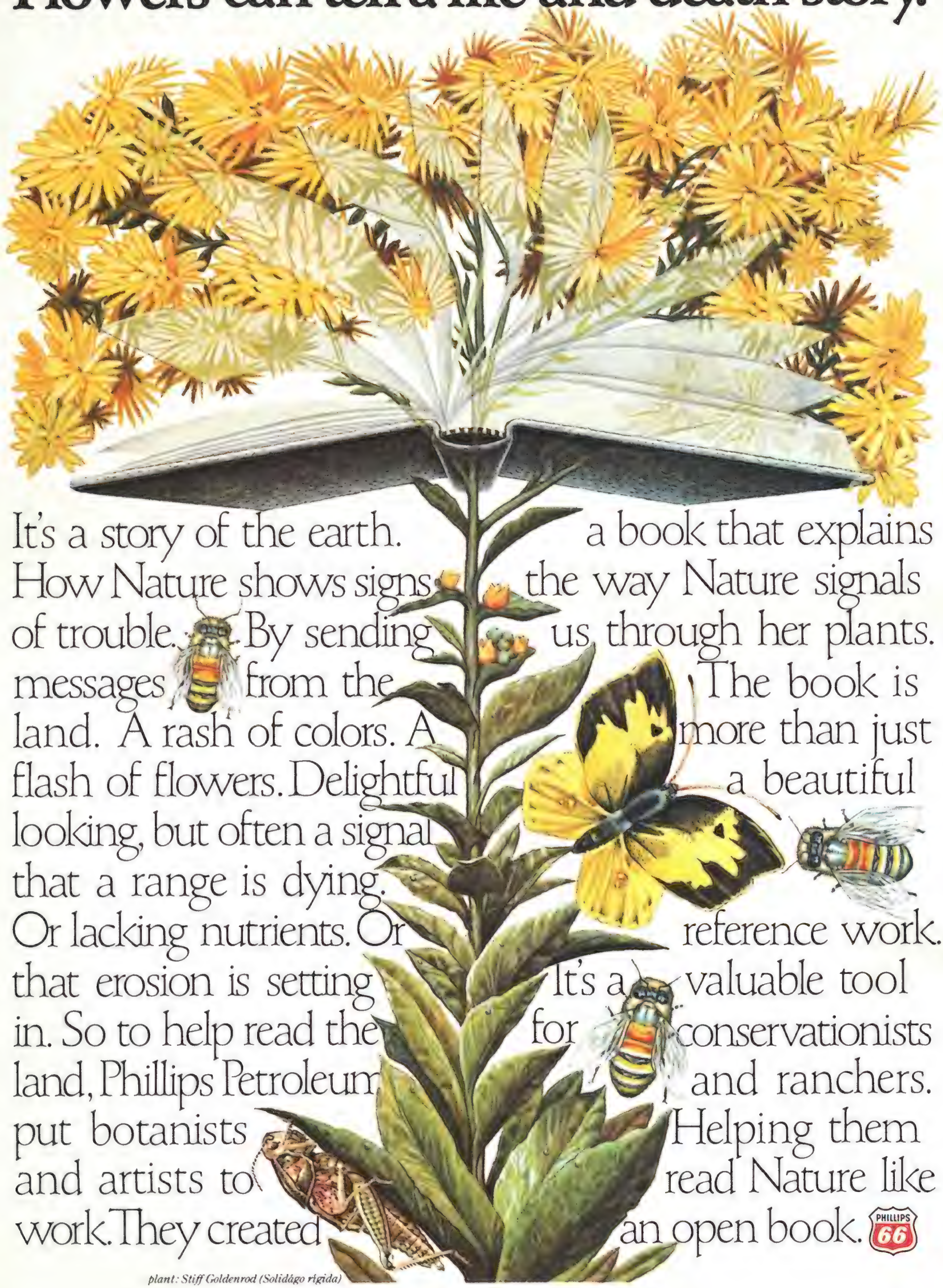

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By Robert T. Cochran

Cold-eyed soldier of fortune who became a 'president'

William Walker, filibuster of the 1850s, briefly ruled over Nicaragua with a rag-tag band of mercenaries

William Walker, though mild of aspect, felt the tug of destiny as he led invading armies of quick-draw Yankees into the lands of Central America.

As the troubles in El Salvador stir conjecture and controversy, it is easy to forget how often in the past we have been involved in Central American affairs. At the turn of the century, as we entered an imperialistic era, adventurers from the States often roamed Central America, seeking a dash of danger, a slice of profit—often from gunrunning—and a heady draft of power. Novelist Richard Harding Davis wrote about them in *Soldiers of Fortune*. Sometimes Washington quietly blessed their efforts or provided its own operatives.

The word for those dabblers in foreign political pots was filibuster. We now most commonly use the term to describe how a legislator stalls proceedings with almost endless speechifying. Back then we used it more accurately, as in the Spanish *filibustero*—one who plunders freely, a freebooter, a pillager.

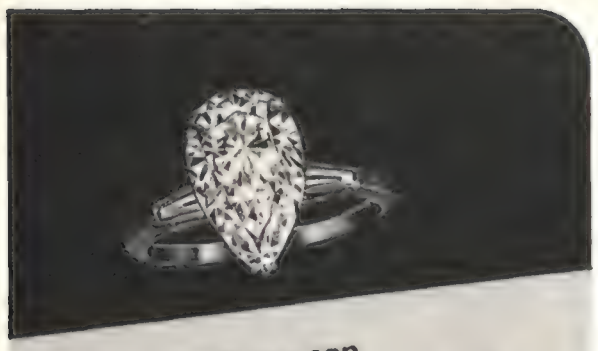
The word certainly describes one of the first of his ilk, a man who terrorized five nations in the 1850s, 40 years before Davis wrote his novel. His name was William Walker and he lives in history books, sometimes only in footnotes, as "the gray-eyed man of destiny."

Portrait of this improbable filibuster: height, five foot five; weight, barely more than 120 pounds; wispy, light hair; shrill, quavering voice; a penchant for ridiculous, ill-matched assortments of uniform. And his eyes. They were flat and gray and called "almost pupilless."

Mr. Cochran, a Washington free-lancer, writes for national publications.

Walker inspired those closest to him, but was largely indifferent to the fate of those who fought under him. He could scarcely speak Spanish. He had few principles, and they shifted without warning. But his belief in his own destiny never faltered until a morning in 1860 when bullets from a firing squad ripped into him in a remote Central American port.

Walker was born in 1824 in Nashville, Tennessee, earned a medical degree at the University of Pennsylvania, studied medicine in Europe, migrated to New Orleans, became a lawyer and then an editor for the New Orleans *Crescent*—all before reaching his mid-20s. In June 1850 he arrived in San Francisco and found the bustling, rowdy city immediately congenial. It seethed with adventure and gold fever. Con men, shady entrepreneurs and reckless adventurers from around the world flocked there to make their fortunes. Some saw Lower California and the state of Sonora, just across the Gulf of



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California, as prime pickings. There were filibustering expeditions to the region—and Walker became involved.

In 1853, he recruited a force of 45 men with which he proposed to conquer the northern part of Mexico. His first effort was a prototype of those to follow. Walker believed he could build an empire on a pinhead, but had only the vaguest notion of how it might be done. The expedition defied U.S. neutrality laws.

Walker's pip-squeak force started off on its mission, first by sea, then across some of the world's most desolate, dangerous territory. Soon hunger, sniping attacks by local *caudillos* and disease turned it into a shambling band of dying men.

True to form, Generalissimo Walker indulged his appetite for pomposity to the full, even during the expedition's most desperate days. With a grandiloquent proclamation, he established the Republic of Lower California, with a flag, constitution, himself as president and a cabinet made up of various expedition members. Stray, bewildered natives were forced to swear oaths as citizens.

Walker remained largely aloof from his men, a difficult performance among only a handful. Posturing as a remote leader, overwhelmed with weighty matters of strategy and statesmanship, he watched his doomed expedition shrivel and disintegrate. Along the march, two soldiers who obviously had more sense than their companions tried to save their skins by slipping away. Always a stickler, Walker tried them according to military law and had them shot as deserters.

Once back in the United States, he was indicted for violating the neutrality laws and tried in San Francisco, which welcomed him as a hero. A sympathetic and almost fawning jury quickly acquitted him as they would have any American who, as a juror put it, tried to "civilize the Greasers."

His crushing defeat as a filibuster only spurred Walker on. A friend suggested he turn his thoughts to Nicaragua. The United States badly needed a better route between its two coasts than the long, difficult overland trek, or the endless sea voyage around Cape Horn. Promoter George Law carried passengers from both coasts to Panama, and hauled them across the isthmus on a primitive stagecoach line. Then Cornelius Vanderbilt, who had made a fortune running steamships on the Hudson River, negotiated a contract with Nicaragua for a route for his Accessory Transit Company. Since Nicaraguan governments changed constantly, and were all bankrupt, most were willing to bargain away whatever their prostrate country could offer to someone who promised to pay regularly in gold.

Beginning in 1851, Vanderbilt's company ran steamers from both coasts to Central America. Instead of clawing their

With a roar of gunfire, Walker's troops storm into Granada, past old convent of San Francisco. Opposing fire comes from the wall at right.

His destiny was to die in poverty and disappointment.

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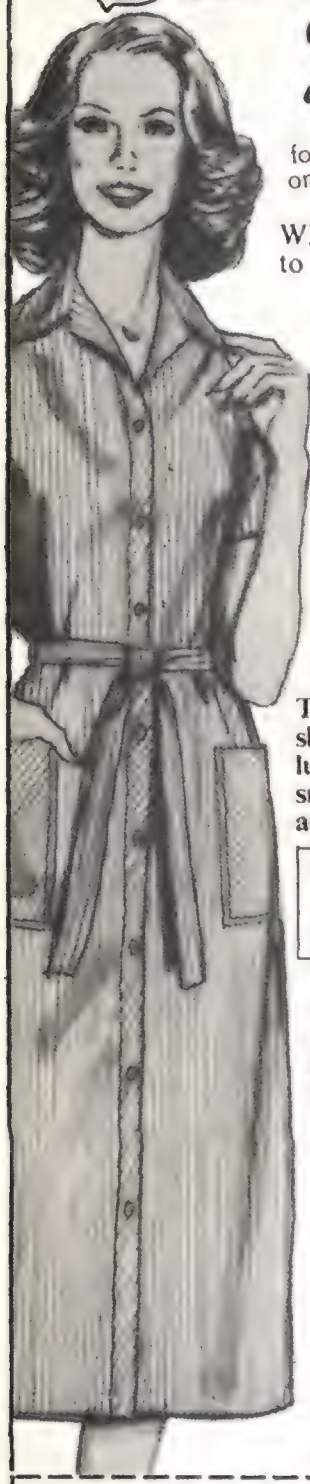

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HABAND for Her

After seizing the convent at Granada, the American filibusters relax inside with wine, tobacco and cards. Women aren't shown in this mid-Victorian print.

way across fever-ridden Panama, passengers traveled in comfort on steamships up the San Juan River from the Caribbean, then across Lake Nicaragua. Westward, only a few miles separated them from the Pacific. The company's sturdy coaches carried them along a smooth road through pleasant countryside.

Soon after the company began to operate, two unscrupulous partners squeezed Vanderbilt out. The line began to make a good deal of money, especially since at first it paid nothing to Nicaragua. Also, in the early 1850s, a slick Texas promoter, Colonel Henry L. Kinney, bought up dubious land titles to a huge chunk of Nicaragua and proposed to colonize it. The U.S. government opposed his scheme and the Nicaraguan minister in Washington denounced it. Kinney and a few followers went to the Caribbean coast of Nicaragua anyhow, and discovered that the Nicaraguans had declared them outlaws. Walker was setting his sights on Nicaragua at almost precisely the same time, invading it under only slightly better auspices.

Two factions, Democrats (Liberals) and Legitimists (Conservatives), warred continually for control of the country. At that moment the Democrats hired Walker to bring a contingent to fight for their cause. Walker knew doing this would get him in trouble with the neutrality laws, so he had the contract rewritten to specify colonists, not fighting men. This placated U.S. authorities. The force Walker was able to muster—58 men—was far smaller than the 200 to 300 he had hoped to enlist. He sailed in the leaking brig *Vesta*, and on June 16, 1855, showed up on a stretch of Nicaragua's Pacific coast still controlled by the Democrats.

He came ashore, grandly named his minute force the Phalanx, whipped it into shape, and set off with a group of insurgents to win a series of astonishing victories. Swiftly, reinforced periodically by newly arrived recruits, he moved to full control of the country. In four and a half months he was its master and commander in chief of its army, operating under a puppet president to provide legitimacy.

There were five nations in Central America then: San Salvador, as it was called, Nicaragua, Costa Rica, Honduras and Guatemala. All, especially Nicaragua, offered promise for settlement and development. Coastal lowlands often were swampy and disease-ridden, mountain regions volcanic and inhospitable. However, large areas were gently rolling tableland, fertile and temperate. There were considerable natural resources, scarcely discovered, much less exploited. The best land was in huge estates, owned by ancient Spanish families and worked by Spanish-Indian mestizos, who were exploited remorselessly by the aristocracy.

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Transit's short, smooth jewel in Nicaragua, were rutted trails. Public services, such as sanitation, postal service and schools, were nonexistent. The Roman Catholic Church, in many parts of Latin America a stabilizing factor during this chaotic period, was parochial and disorganized in Central American nations.

Armies dared each other to fight

These conditions help to explain how a determined filibuster such as Walker could succeed so easily. Central American "armies" (a force of two or three thousand was exceptionally large) consisted of peaceable peasants, shanghaied into service, who had almost no training and often only their machetes as arms. If hostile forces encountered each other in open country, they sometimes simply melted away, making the engagement a curious nonencounter. For this reason, many commanders preferred to retire to towns and dare their opponents to try to force them out. Towns were built around a square, typically dominated by a church with thick adobe walls and a tower. Muskets in the tower could command the streets.

Besiegers, meanwhile, seldom could seal off their objective. Surrounding detachments were rarely where they were supposed to be, making coordinated attacks impossible. Soldiers and officers alike were often sick and hungry. They slept or got drunk whenever possible.

Truce parties shuttled between besiegers and besieged, offering terms and carrying menacing threats. If an attack on a town succeeded, survivors (especially officers) usually were methodically butchered, sick and wounded first since they offered less resistance. Some bodies were buried, the rest were stuffed down wells.

Walker led quite a different force. Many of his men were Mexican War veterans, armed with Mississippi or Minié rifles, a Colt revolver on each hip and deadly bowie knives. They wore blue flannel shirts, blue cotton breeches, boots and black felt hats, and many were in Central America for all the loot, adventure, liquor and women they could find. Nobody, however, ever accused Walker of personally campaigning for loot and wealth. Combat did not excite him. A victor's personal "perks" of debauchery were not for him, for he was abstemious.

Walker's men were susceptible to local

Cornelius Vanderbilt, developer of trans-Nicaraguan route, hated Walker.

diseases and were accustomed to better rations than a peasant soldier's dried corn and occasional handful of fruit. Their preferred way of preparing for an engagement was to get drunk to fortify their courage. Usually they were indifferent to the natives, except as sources of *aguardiente* and female companionship.

For all his pomposity, Walker was a consummate organizer. Writing as always in the third person, Walker tried to explain an astonishing victory in open country near Lake Nicaragua soon after he arrived in Central America: "Walker's loss was trifling, and, considering the duration of the action, its heat, and the close distances at which the firing was done, almost inexplicable. . . ."

He climaxed his first campaign by capturing the enemy stronghold of Granada, later describing the action: "Then the Americans seeing, from the startled air of the people in the suburbs, that the Legitimists were completely taken by surprise, threw off their coats and dropped their blankets, rushing forward with a shout to gain the first barricades. . . . A shout from the advance announces that the Plaza is won, and the last few shots were fired from the gallery of the government house as Walker entered the square." Adroit maneuvering, devastating firepower, a bewildered and disorganized opponent, all account for Walker's unbelievable early victories.

Walker's regulations indicate a long-range purpose. He refused the services of any conscripted native. His physicians

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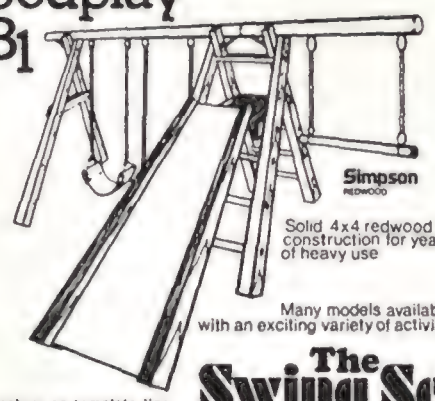

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William Walker's troops march off the quay after disembarking from a paddle-wheeler at Virgin Bay, on Lake Nicaragua in March of 1856.

cared for enemy, as well as their own, sick and wounded. Conspicuous looting meant instant dismissal or harsh disciplinary action. Enemy prisoners and the sick and wounded never were shot. Once in charge of the country, Walker set about establishing an operating civilian government, staffed partly by Americans, and sending out survey parties to discover opportunities for development and colonization, although neither materialized. He insisted his American troops would take up farming. All had become Nicaraguans.

Fighting subsided briefly late in 1855, once the Walker-backed Democrats were in power. He was elected president in June of 1856 by an overwhelming, ostensibly honest vote. President Walker had two great needs, one of which depended upon the other. First, he had to maintain a steady stream of recruits from the United States to replace casualties and increase his forces. Second, he had to control the Accessory Transit Company's operation and keep it open. Control meant his government pocketed the lease payments, if any, and an operating company meant recruits could reach him with greater ease.

And there *were* recruits. News of Walker's successes blazed across newspapers in the United States, exciting restless young men and firing them up to go to Nicaragua and share in the adventure and glory. Walker had agents in San Francisco and in Southern cities to sign up new followers. He also skimmed recruits from passengers taking the Accessory Transit to and from California.

The most men able to fight that Walker had at any one time was about 1,200. During his entire first foray into Nicaragua, 2,288 served (for all his vagueness, Walker kept remarkably accurate records). Of these, an incredibly high percentage were killed, wounded, died of disease or deserted. One company commanded by an officer named Turley enlisted as a body and insisted on remaining together. Walker soon learned why. They deserted as they had enlisted, together, and began to pillage the countryside. A group of Frenchmen in a menaced village (there were surprising numbers of foreigners in Central America) organized to stop Turley, surrounded his force and, when it surrendered, shot them all.

Not all in Walker's army were Americans. The world had a floating population of soldiers of fortune who fought wherever they found a likely war. One of Walker's most valuable officers was an Englishman named Charles Frederick Henningsen, who began fighting with the Carlists in Spain when he was 19. He drifted to Russia, fought for Hungarian independence in 1849 and joined Walker in 1856, becoming a brigadier general.

Walker had companies, battalions and regiments, commanded by a dizzying profusion of generals, colonels, majors, captains and lieutenants. The leader himself

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With an even weaker force than usual, Walker landed at Trujillo, Honduras, in August 1860. The invasion failed and he was shot. "I alone am guilty," he said.

was surrounded by staff officers of imposing rank, and protected, by his own account, by a praetorian guard of 50 Cuban mercenaries.

There were ranger companies, rifle companies, artillery companies, and engineer, sapper, medical and commissary units. Contemporary evidence indicates that most of these imposing-sounding units in fact were composed of a mere handful of men. Walker led his force with remote dignity and sternness; as a biographer put it: "indifferent to human suffering, winning no man's affection, but every man's respect." He worked from six in the morning until ten in the evening with no time out for fun because apparently he never had any. He was ceaselessly busy cajoling his Nicaraguan associates and dispatching orders to his scattered forces that often were ignored.

At the height of his success, Walker had few friends anywhere. Franklin Pierce, then President of the United States, recognized Walker's regime only grudgingly, to warn Great Britain not to help other Central American countries destroy it, which they eventually succeeded in doing anyhow. Pierce's Secretary of State, William Marcy, had no use whatsoever for Walker and opposed him vigorously. In the United States, powerful Democratic factions in the North and East grumbled about events in Nicaragua, but muted their condemnation because of Walker's support among their Southern brethren. Controversy over him might have split the party.

Walker's background was hardly pro-slavery. His father had never kept any slaves and the New Orleans paper for which he worked as an editor was conservative. Indeed, he apparently held no strong personal views on the slavery question. However, in a strong bid for Southern support, Walker often wrote approvingly of slavery, and it was his intention to reestablish slavery in Nicaragua (where it had been abolished in the 1820s) and to revive the slave trade.

He never actually did so, but his decree of September 22, 1856, paved the way for renewed slavery and signaled the South that his sympathies were with them. Undoubtedly, if his plan to create a new slave republic had been carried out, such a strong military federation in Central America would have proved a most valuable ally for the South after its secession.

Cornelius Vanderbilt, powerful voice of the financial community, hated him, not only because he controlled the valu-

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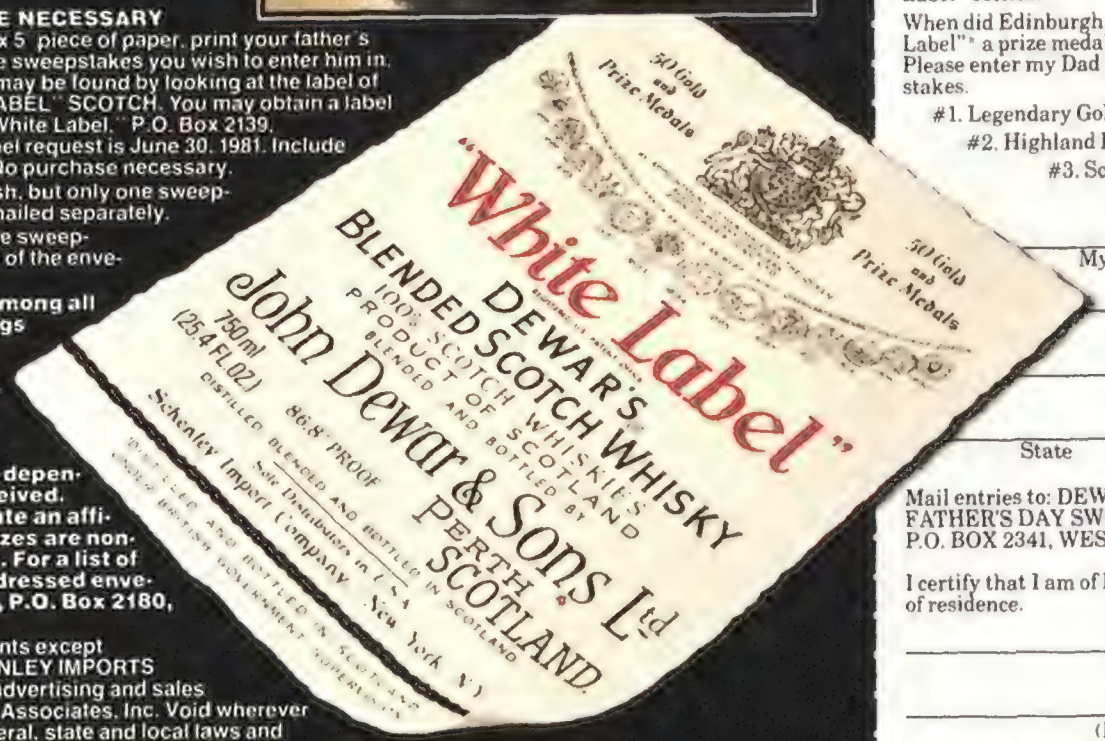

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able Accessory Transit route, but because he negotiated with and, in fact, aided the sharp partners who had wrestled control of the company from Vanderbilt. In December 1856 Vanderbilt, once more in control, closed the Transit to starve both Walker and his scheming ex-partners out. Vanderbilt even plotted with the government of Costa Rica to set up a Nicaraguan regime willing to negotiate a new contract with him.

Costa Rica and Central America's other nations needed no encouragement to fight Walker. Once elected president of Nicaragua, he became the Yankee peril personified, and they quickly united to throw him out. The allied army that invaded Nicaragua was a rickety force. Contingents from the various countries were as hostile to each other as they were to Walker, and at times had to be deployed separately so they would not fight each other. In the end, a total of some 18,000 allied troops had fought Walker's approximate 1,200, at one time or another.

Captured, he bounced back into trouble

Walker's luck finally deserted him. He concentrated his force in the town of Rivas, where desertions, harassing allied attacks and short rations finally convinced him his cause was hopeless. British and American warships helped tighten the noose. On May 1, 1857, he surrendered to Commander Charles H. Davis of the U.S. sloop of war *St. Mary*, who guaranteed him safe conduct back to the United States. Other Americans also were evacuated. Central America, Great Britain and the United States were elated. At last the dangerous filibuster had been eliminated. Or had he?

Back in this country, Walker immediately raised another force. Late in 1857, he was on his way back to Nicaragua, but the Buchanan administration in Washington cut short another chapter in the Walker saga. Although he managed to slip out of New Orleans, he was intercepted as he was landing in Nicaragua by a U.S. warship and hauled back to this country. During his final enforced stay in the United States, while he was gathering forces for one last try at Central America, he wrote a remarkable book, *The War in Nicaragua*. Even his enemies praised its honesty and accuracy.

Walker bided his time until the summer of 1860, when with a force weak even by his standards, he invaded Honduras. Boxed in by native forces, he surrendered to Commander Salmon, of H.M.S. *Icarus*, and once again was promised safe conduct home. Instead, Salmon turned him over to Honduras. Walker was gunned down by a firing squad on the morning of September 12. At age 36, he was gone. His passage was only briefly noted in the United States, then girding for a war of its own.

Although Walker proclaimed no grand design, had his dreams succeeded he would have been a considerable world figure. He wanted to revive the Central American Federation, which had united the five nations between 1825 and 1838, and colonize it with Anglo-Saxon immigrants, mainly from the United States. With a united, prospering Central America as his base, Walker planned to conquer Cuba. Icing on this considerable territorial cake would have been a trans-isthmian canal through Nicaragua, which in many respects had and has a superior route to the one across Panama.

Walker's unmarked grave is long since lost, but for a time just after his death, there were efforts to bring his body back to Nashville for final burial. But the efforts came to nothing—just like the destiny in which he had so fervently believed.

Walker gets last rites as he faces death by firing squad after capture in Honduras.

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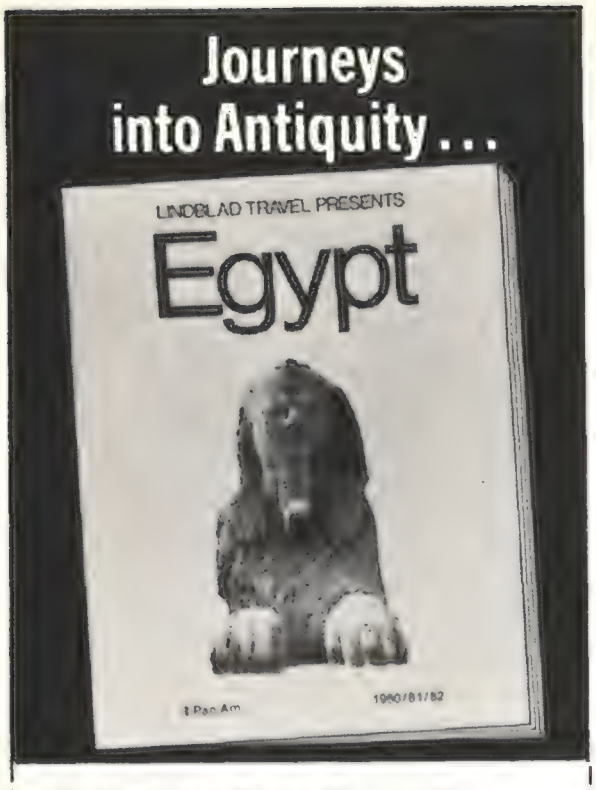

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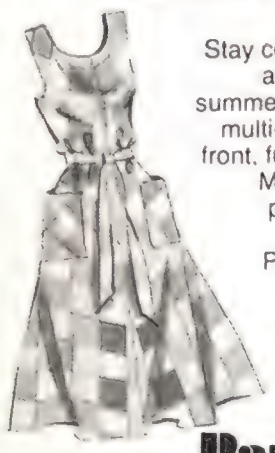

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Book reviews

Extinction: The Causes and Consequences of the Disappearance of Species
Paul and Anne Ehrlich
(Random House, $14.95)

The awesome statistics of our degradation of Earth's living resources may be familiar to many by now: a tenth of all life-forms endangered, a fifth to a half headed for eradication by the end of the century. Surely, as members of the industrialized fifth of the world that consumes the majority of its resources, we should not ignore these figures.

Nearly a decade ago biologist Paul Ehrlich sounded the alarm against human overpopulation in his best-selling *The Population Bomb*. Now he and his wife and fellow biologist, Anne, have directed their sprightly style and considerable scholarship toward what E. O. Wilson has called "the worst thing that can happen": the loss of genetic and species diversity.

Our capacity for brutality appears to be both universal and boundless. The Ehrlichs tell of Argentinians using live penguins for soccer balls, Russian soldiers directing heat-seeking missiles at deer, American hunters chasing eagles with helicopters. But as threats to wildlife such atrocities pale beside the wanton destruction of habitat. The tropical rain forest, home to the greatest variety of organisms, is being chewed up to make furniture and pasture for future hamburgers at a rate of about 50 acres a minute. There may well be no rain forest to denude at the dawn of the 21st century.

The significance as well as the scope of our nest-fouling is the Ehrlichs' subject. They review the moral and esthetic imperatives for saving species that trigger concern in many of us. They also sum up the complex and potentially catastrophic atmospheric changes that desertification, pollution and carbon dioxide buildup can have upon all life.

But it is in detailing the scientific and economic value of the wild that the Ehrlichs build a case for conservation even the most self-interested parties would be hard pressed to contradict. More than 1,000 alkaloid medicines have been discovered via screening of known flowering plants, a task that is only two percent complete. From sponges come cytarabine, a drug to combat leukemia and herpes. Ancrod, an anticoagulant, is drawn from the venom of a Malayan pit viper.

The product value of the majority of Earth's plants is still unplumbed. Most of the food crops are derived from fewer than a score of species. Protein-rich plants like quinoa and amaranth, once harvested by South American Indians, have been ignored. Cultivation of ipilipil (*Leucaena*), an evergreen legume which grows 26 feet a year, would provide livestock forage as nutritious as alfalfa, and a 5,000-acre grove holds the harvestable equivalent of a million barrels of oil. What we are extinguishing, then, is the hope for our survival.

The weight of such examples in *Extinction* can be numbing, and the authors get some excess mileage out of a central metaphor of species as rivets in Spaceship Earth, which, they maintain, is "swarming with rivet-poppers." Much of the predicament and rather more remedies are detailed in Norman Myer's marvelous *The Sinking Ark*. At times, as when calling Zbigniew Brzezinski a "friend of nuclear war," their tone is too strident. But *Extinction* makes accessible and compelling reading of a complicated issue.

The important thing to consider, the Ehrlichs point out, is that, although extinctions have been happening for centuries, the process has been accelerated in our own time. "The crucial point is that the dinosaurs became extinct at a time when evolutionary processes were capable of replacing them with the mammals." Extinctions are occurring today, however, for which evolution is not prepared; there are no replacements. For "the same human activities that are causing extinctions today are also beginning to shut down the process by which diversity could be regenerated. . . ."

Tom Lovejoy of the World Wildlife

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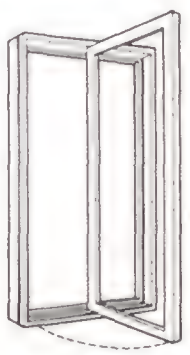

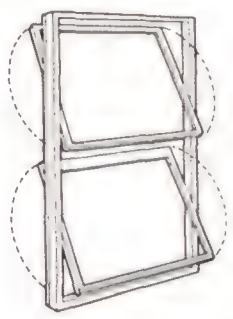

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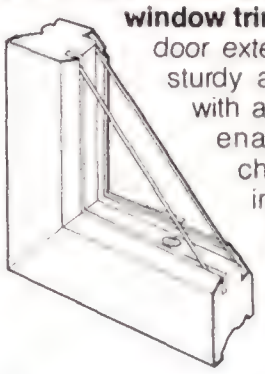

The Cladding on the sash is lap-jointed and sealed at the corners giving a smooth, weather-tight mitered appearance. Plus, Pella also offers Cladding on custom size and shaped fixed windows.

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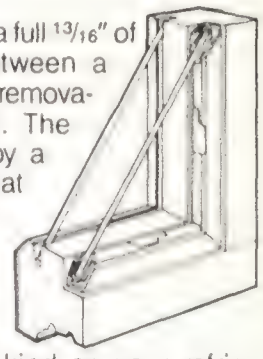

Key to the Pella system is a full $^{13}/_{16}$" of insulating air space between a fixed, outer glass and the removable interior glass panel. The glass panel is isolated by a vinyl gasket and wood that function as a thermal barrier to control condensation. Pella Casement and Awning windows have flexible vinyl weatherstripping, similar to the kind on your refrigerator, that reduces air infiltration up to 16 times better than industry standards.

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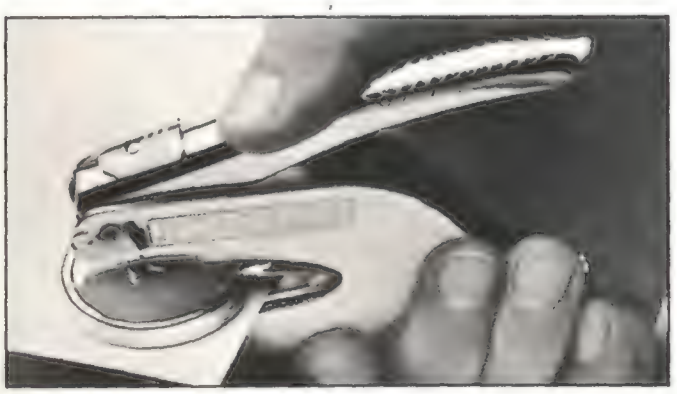

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Fund has said, "It is up to science to spread the understanding that the choice is not between wild places or people. Rather it is between a rich or an impoverished future for Man."

Extinction can help us make a choice.

—Don Lessem
Naturalist, author and critic

Sonya: The Life of Countess Tolstoy
Anne Edwards
(Simon and Schuster, $15.95)

For a long time, diaries were one of the few literary outlets available to women. In Victorian England, Revolutionary America, Enlightenment France, Romantic Germany, many a well-known example was scribbled down, helping give women's writing the confessional cast and personal tone that much of it continues to have. Still, it was unusual for a husband to take enough interest in his wife's thoughts that he insisted they consistently trade their journals, eschewing all secrecy. But this is exactly what the great Russian novelist and idiosyncratic thinker Leo Tolstoy did. What he read in his wife's diary and she in his, and what we are now able to read into them, provide the most mesmerizing of true stories.

Serene pose in 1909 photograph belies turbulence of Tolstoys' 48-year marriage.

Tolstoy's diaries reveal that, having led a profligate youth, he was by his early thirties filled with self-loathing, and this seems to have been the rather ambiguous motivation for his decision to marry. He chose as his bride the 18-year-old Sonya Behrs. By focusing attention for the first time on this beautiful, intelligent, sad and largely misunderstood woman, Anne Edwards helps revise history in a way that is both sober and sobering. She takes what have long been only rumors from

the forest of the Tolstoys' tempestuous lives and the complex society they lived in, and solidifies them into a well-reasoned and enthralling account.

Theirs was a passionate match and it lasted 48 years, from their marriage in 1862 to Tolstoy's death in 1910. The marriage was buffeted between love and hatred, intense happiness and abject misfortune, rationality and unreason. This storm of extremes was mostly Tolstoy's doing: he operated in polarities. His enthusiasms, whether intellectual, political or religious, waxed and waned. Sonya bore the brunt of his ups and downs, especially his vacillations between desiring her sexually (which she reciprocated) and wanting to see her as a symbol of purity about whom carnal feelings were "evil" (this attitude Sonya hated). For the sensual Sonya was emotionally and physically in love with her husband. Her honesty about and knowledge of those feelings, and the situations in which love embroiled both her and others—the un-Victorian quality of it all—make books like *War and Peace* and *Anna Karenina* seem almost mild by comparison.

It is also amazing how soon the couple's fights began. How early and how wounding was the revelation that, despite Tolstoy's belief that all men are equal, he never included women in his vision of humanity. Another startling hypocrisy was his ambivalent behavior toward the peasants whose cause he espoused in the abstract. Sonya's more honest aversion toward the serfs may have stemmed from her jealous knowledge of Tolstoy's earlier liaison with a peasant woman.

By the time she was 19 and painfully nursing her first child at inflamed breasts because Tolstoy claimed that it was immoral for women to use wet nurses, Sonya was well on her way to the mental anguish which, in later years, would engender bouts with hysteria and madness. All this personal war and peace went into Tolstoy's art, not only causing Sonya great hurt as her most intimate experiences were transformed into thinly disguised fiction, but also robbing her of material she would have liked to incorporate into fiction of her own. But she knew her husband was a great writer and she dedicated herself to making him as successful and famous as possible, editing and copying his work (she transcribed most of *War and Peace* at least eight times), taking care of 12 children (and

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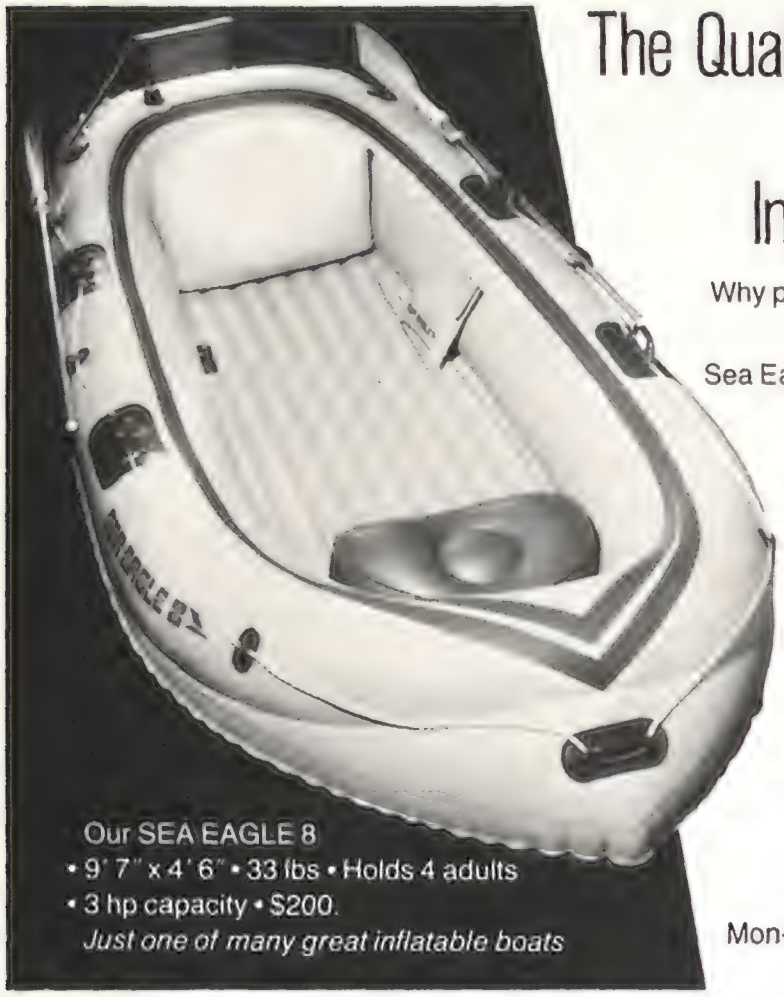

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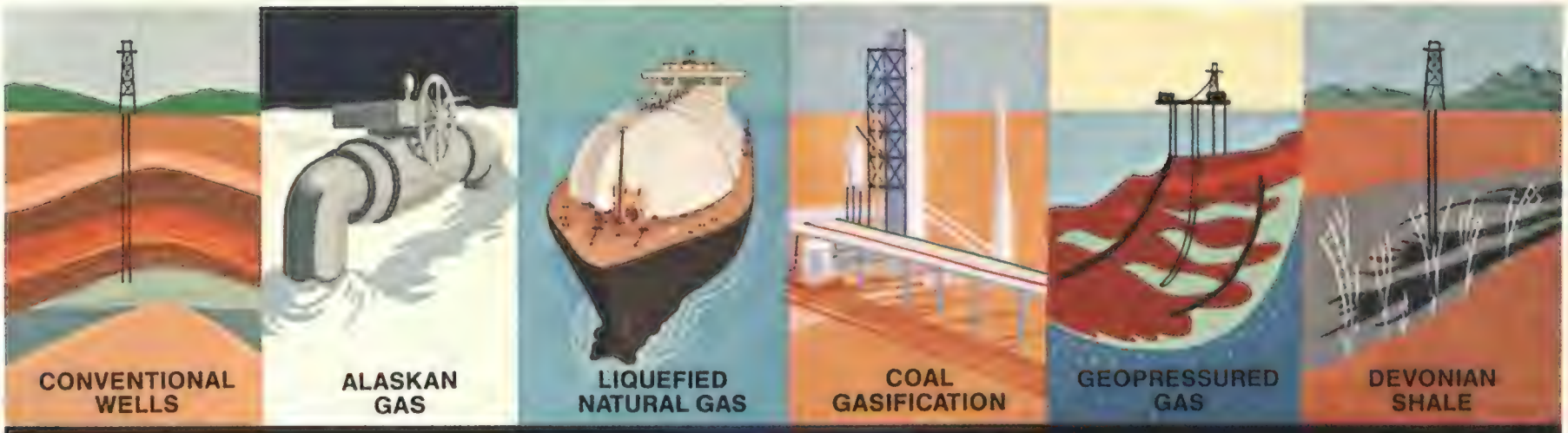
writing delightful stories for them), managing a large country estate and city homes, running a publishing business, and making sure that Tolstoy had no distractions. It was all the more difficult for her when Tolstoy, preaching indiscriminate charity, opened their home to hordes of strangers.

It is tantalizing yet probably foolhardy to speculate about what Sonya might have been had she not married Tolstoy or had she lived a century later (as it was, she lived well into the 20th century, outliving four czars and surviving the Russian Revolution), for the bottom line is that she remained the remarkable Tolstoy's remarkable wife. Her struggles to stop Tolstoy from making his books the property of the public domain, her strictness with their children, her resentment of his scheming disciple Chertkov, arose not from greed but from pride, the need for dignity on the part of a woman groping toward independence while enslaved by love. Russian society was far from liberal in its conception of women.

That society was the fabric of Imperial Russia, a culture glittering with court pomp and shining with intellectual activity, a country dancing on the backs of starving peasants and to the tune of bloody wars, a fairy-tale kingdom darkened by the cruelty or imbecility of its rulers. Festivities—country balls, family birthday parties, coronation banquets, concert-going, literary gatherings—did brighten Sonya's life and they give this book vividness as colorful as patches of wild flowers scattered over the otherwise barren steppe.

And then there are Tolstoy's famous final days (described at the beginning and end for heightened effect), when he left his home only to die in the train station at Astapovo; Sonya was denied entrance until he was unconscious. Although she outlasted him by a decade, she essentially slipped into unconsciousness after that time, too, retreating into the past and private worlds.

But during the Astapovo death sequence Sonya and her Leo were as public as could be—the milling crowds, the swarms of reporters, photographers and film crews are both reminiscent of a scene from Eisenstein and a turning point in the modern age he helped pioneer. In Anne Edwards' *Sonya: The Life of Countess Tolstoy* the camera angle shifts to concentrate on one woman's life to that



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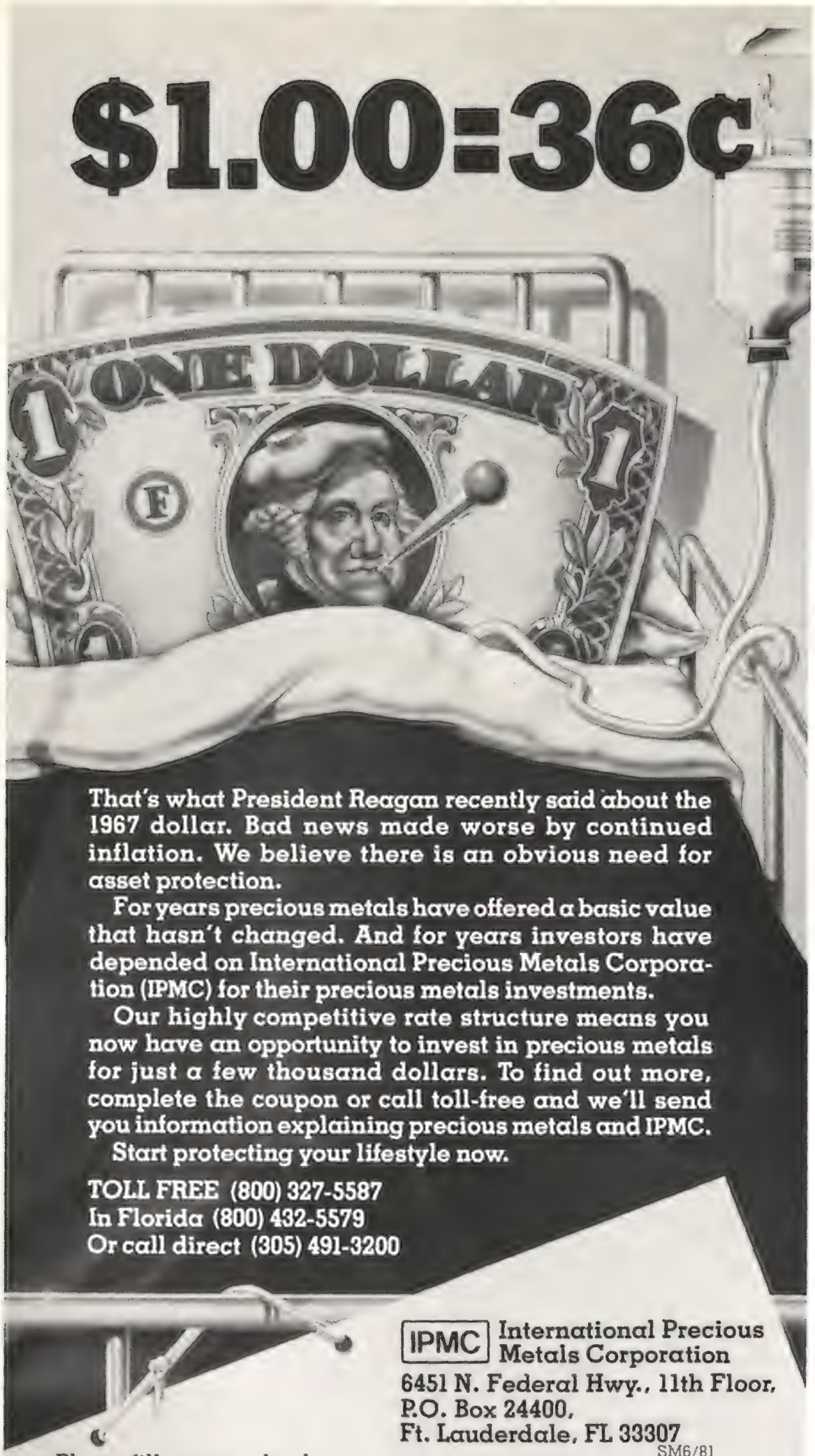
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moment. A very important vantage point.
—*Celia Betsky*
Associate editor, *Portfolio* magazine

The Greatest Power on Earth: The International Race for Nuclear Supremacy
Ronald W. Clark
(Harper & Row, $13.95)

Until now the English historian and science writer Ronald W. Clark has been best known in this country for his biographies of Einstein, Bertrand Russell and the Huxley family. These biographies have been widely praised; they are well researched, very readable and intelligently put together. Clark has matched these high standards in his latest book, *The Greatest Power on Earth*, a chronological history of the development of nuclear power from early in the century to the present. "Biography is one thing, history another," historian C. Vann Woodward wrote recently. Clark here proves himself equally adept at both disciplines.

The search for the secrets of atomic power began in earnest in the first decade of the century following Einstein's 1905 publication of the theory of relativity. Physicists from many countries—including Great Britain, France, Germany, Russia, Italy and the United States—spent the following decades trying to unlock the stubborn secrets of the atom. Tracing that complicated and complex story required an enormous amount of research, and Clark was equal to the task. He pored over documents, diaries, letters and secondary sources, and interviewed the surviving players in that international drama.

And there was drama, especially during the 1930s and 1940s, as first scientists and then politicians began to comprehend the awesome potential of nuclear power. Clark describes this process as "a long series of small steps rather than . . . a single unexpected stride." Yet each step contributed to the dissolution of international trust. Wartime activity, caution, industrial rivalry and general lack of understanding about nuclear power led to what Clark terms the "fumbling of the greatest catch in human history"—the failure of "honorable men" (Churchill, Roosevelt, Truman and Stalin among them) to halt the distrust and suspicion that spread among the Allies during and immediately after the war. This spirit of noncooperation, Clark says, "brought in the Cold War, the nuclear arms race, the

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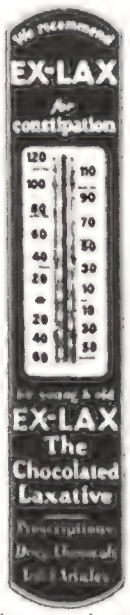

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economically crippling policy of peace through terror, and the threat of the 'plutonium society.'"

In telling the story of the development of nuclear power Clark provides many explanations of the technology involved. His descriptions of the advances in nuclear physics are drawn simply enough to be understood by the general reader, but are by no means oversimplified. It helps to know fission from fusion before you read the book, but it is not at all necessary. Clark's physics lessons in no way distract from his parallel, and compelling, story of the international political machinations involved in the race to build the first atomic bomb.

All this is done in an objective manner. This is no easy task. The controversies over nuclear weaponry and power have been among the most hotly debated of the century. Yet Clark gives balanced descriptions of the arguments surrounding the various controversies—including the U.S. administration's not informing the Russians of the state of American nuclear technology, Truman's decision to use the atomic bomb against the Japanese, the moves by Britain and France to develop nuclear weapons after the war, the decision to build the hydrogen bomb and the future of nuclear power.

On the issue of nuclear power, for example, Clark cites the "anti-nuclear lobby" for its "considerable success during its relatively short life." He credits it with influencing governments—from Austria's to New York State's—to curtail nuclear power development. Clark warns of the dangers of nuclear-waste storage and power-plant safety, yet also says there is a "plausible argument" that only nuclear power "can cope with the energy demands of the coming decades."

Clark finally gives a grudging acceptance to nuclear power, which he says "presents a very remote chance of a very serious disaster." But he remains skeptical about the issue of nuclear-waste disposal, pointing out that "fresh evidence still tends to undermine the official line taken by most countries that there is little to worry about. . . ."

One of Clark's main concerns today involves the ramifications of our "plutonium society." Plutonium, produced in nuclear reactors, is used to make nuclear weapons. The world's supply of plutonium is increasing daily, enhancing the chances that a terrorist group may one day obtain it. No one looks forward to that day. But Clark argues that the shock of a nuclear exchange or a massive nuclear power-plant accident may be needed to shake the world "awake to a greater realization that the dangers, as well as the opportunities, of nuclear fission are of an order totally different from those with which *Homo sapiens* has yet had to deal." *The Greatest Power on Earth* shows only too clearly just how totally different.

—Marc Leepson
Staff Writer, *Editorial Research Reports*

Love Among The Butterflies
The Secret Life of a Victorian Lady
Margaret Fountaine, edited by W. F. Cater
(Little, Brown, $16.95)

The least engaging and forthright part of this delightful book is its title; it should have been reversed. Margaret Fountaine, English eccentric *extraordinaire*, was a distinguished collector of 22,000 butterflies, *diurnal lepidoptera*, for which she traveled all over the world, often alone. Men, however, were never far from her thoughts. The pursuit of butterflies seems to have been quite secondary to the pursuit of love and adventures.

Miss Fountaine's interests were helped by a small private income and hindered by her questionable taste in men. Among the latter was a chorister, given to drink and considerably beneath her station, no small consideration in 1890. After several letters to him went unanswered, she wrote that she had become an heiress. Her diary description is characteristically candid: "I had thought out this letter very carefully; I did not consider it to be a bad one seeing the delicacy of the matter—the fact being that I was in a sort of roundabout way not offering myself for sale to a rich husband, as many other women had done before me, but offering, as it were, to buy the love of the man I loved. Nobody was more fully aware of the position than I was myself."

In the end, she failed to win his love, a disappointment she also recorded with touching candor: "The greatest passion, and perhaps the most noble love of my life was no doubt for Septimus Hewson, and the blow I received from his heartless conduct left a scar upon my heart, which no length of time ever quite effaced." She wrote this half a century later, however, before sealing up her diaries.

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Margaret Fountaine willed her collection of butterflies to the Castle Museum in Norwich, England. The deed of gift had one intriguing condition; the museum must accept a sealed black japanned metal box, which could not be opened until April 15, 1978. Miss Fountaine died on a collecting expedition to Trinidad in 1940 and when the box was opened 38 years later, 12 large ledgers were found. They contained more than a million words, begun on April 15, 1878, richly illustrated with her paintings, drawings and photographs, and describing her life from 16 to 76.

What saves these diaries, at least the excerpts the book offers us, from the stolid preciousness of many contemporary Victorian efforts, is Miss Fountaine's wickedly acute perceptions about herself and her world. She found English country life and men tiresome and lost no time in letting it be known. Upon returning to Norwich from Switzerland in 1892, she writes: "I suppose it is necessary to one's moral digestion to swallow so many degrees of district visiting, Blind Asylum Fridays, Charity Bazaars, etc. to counteract the delights of roving over foreign lands with a tolerably well-lined purse." Of her mother, she says ". . . surely God must be angry with this poor world to have turned such a scourge as that loose upon it for 74 years." And "I suppose that Englishmen do make love sometimes, too, though I can't imagine what it would be like."

In the United States, Margaret Fountaine stalked butterflies in Palm Springs.

As she traveled more widely and made up for lost time—she was first kissed at the age of 28—we see her personality begin to unfold, much like one of her butterflies. She discovered she was a "born naturalist." She also became a rather remarkable flouter of conventions. Although not so glamorous as her fellow flouter Lady Randolph Churchill, who married two men young enough to be her sons, or so literary as George Eliot, who lived with a married man for more than 20 years, Miss Fountaine managed to set a very snappy pace indeed for a wellborn Victorian lady.

In between "improper propositions," she bicycled across Italy and Austria, and crossed a Swiss glacier "without a guide, with nothing but tennis shoes, and the butt-end of our nets to serve for alpine stocks." Determined that "the love of a true, good man is forever denied to me," she was equally determined to "get all the pleasure I can from *bad* men that I meet, that is to say going to the very edge of the precipice, but without falling over it." In spite of her frankness in other areas, this is the closest we come to knowing the state of Miss Fountaine's maidenhood.

In 1901, she did meet a "true, good man," however, and together they spent the next 27 years traveling the world. Khalil Neimy was a Syrian who began as Miss Fountaine's dragoman and, through unfailing devotion, became her friend, companion and, ultimately, her "fancy husband." But they were never, however, on an equal footing. When they traveled by train, she bought a first-class ticket for herself, and a second-class ticket for him. In the bush, it was he who prepared the food and did the washing up. In spite of her insistence in her will that the butterfly collection be known as "Fountaine-Neimy," their relationship was a case history in class boundaries.

Rather annoyingly, the book ends with three more volumes of her diaries untouched. A summary of her adventures for the next 26 years is provided in a cloying epilogue set at "fast forward." "She was to become an ardent admirer of the United States. . . . She was to know real and bitter grief; and she was to fall, lyrically and ridiculously and endearingly in love again. . . . She was to explore great South American rivers," and so on. I would have preferred to hear it *straightforward* . . . from Miss Fountaine.

—Jill Merrill
Washington writer and critic

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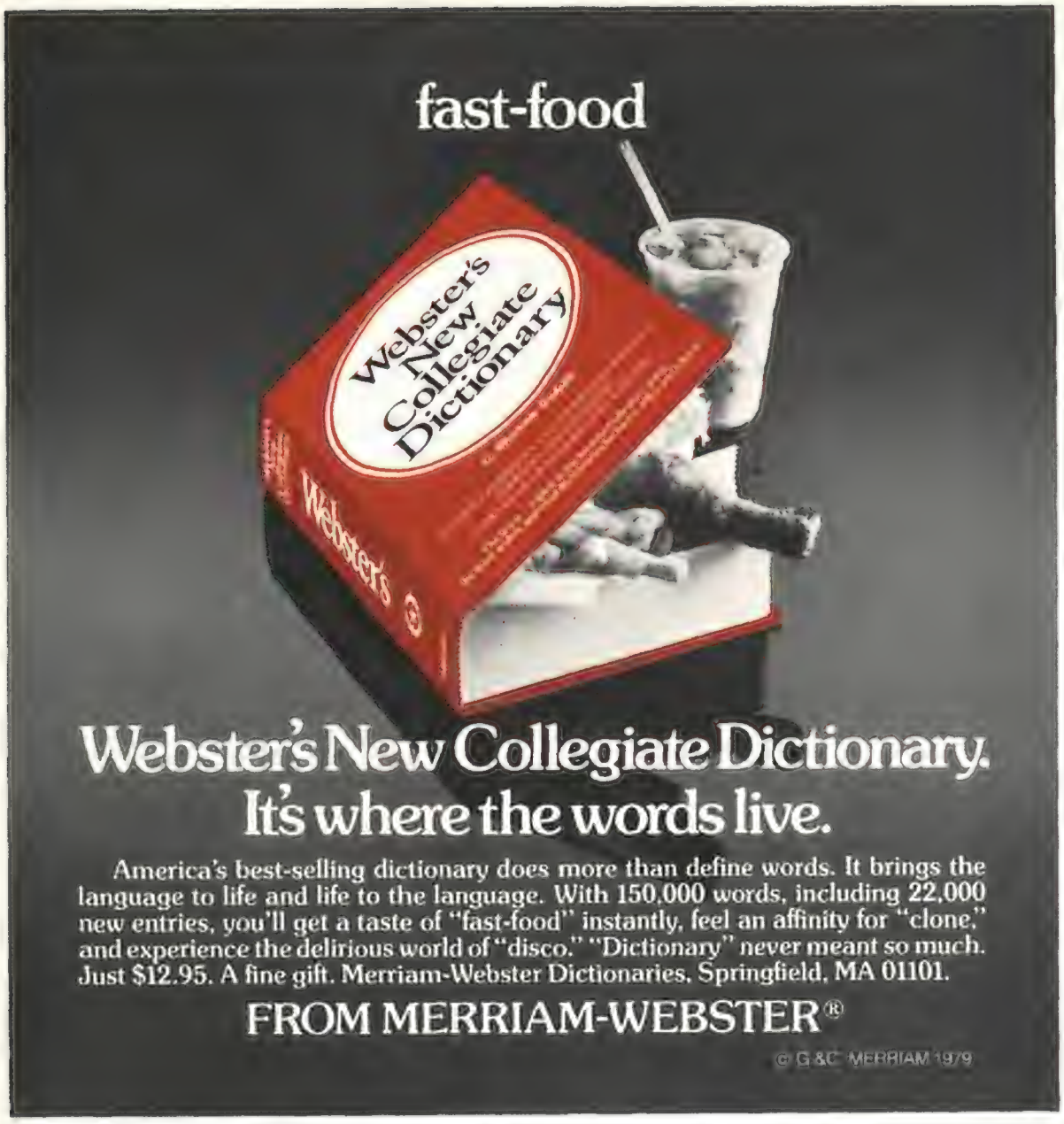
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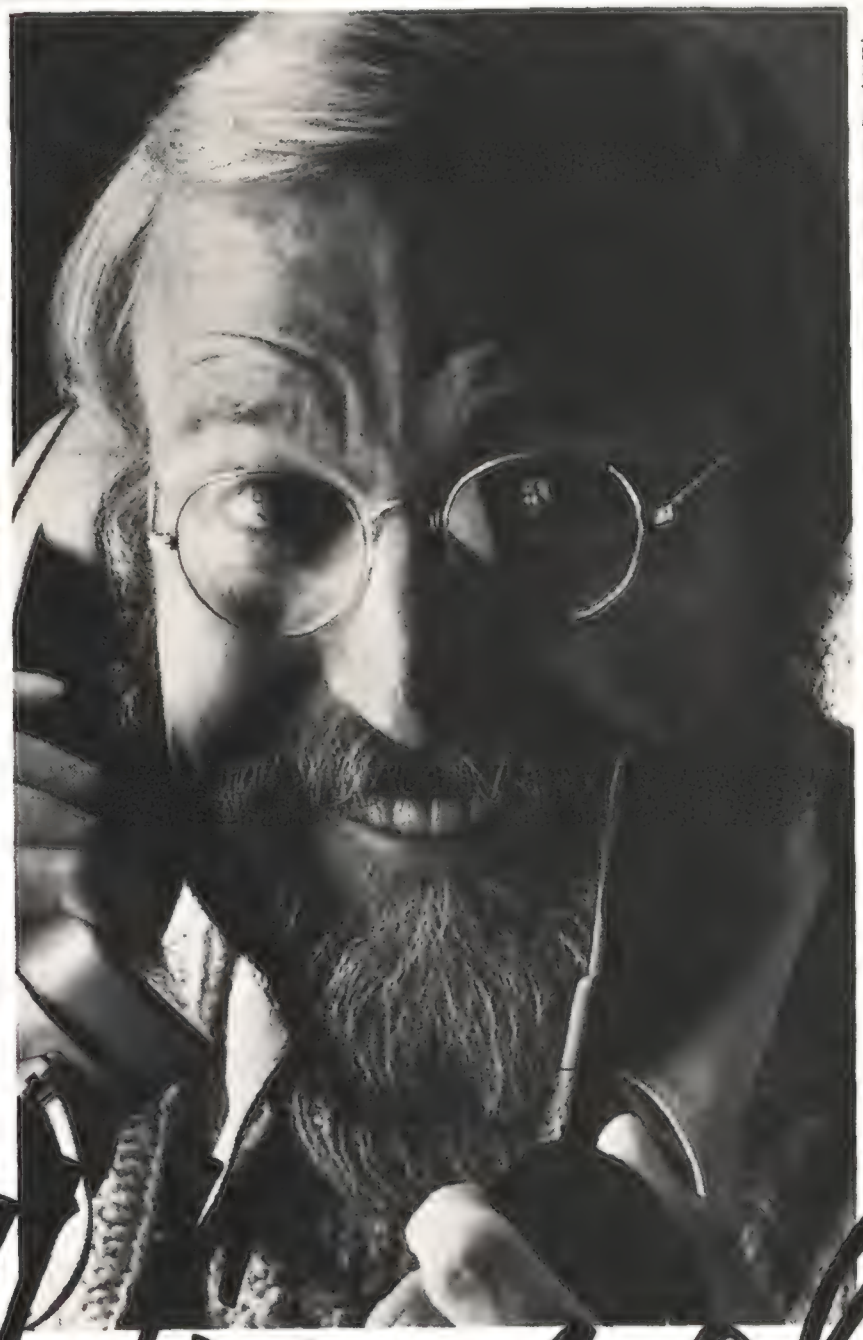

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San Diego Aero-Space Museum (p. 72)

The Spirit of St. Louis by Charles A. Lindbergh, Scribners, 1953

Charles A. Lindbergh: An American Life, edited by Tom D. Crouch, Smithsonian Institution Press, 1977

Encyclopedia of Aviation, Scribners, 1977

Chautauqua (p. 80)

Chautauqua by Theodore Morrison, University of Chicago Press, 1974

Three Taps of the Gavel by Alfreda L. Irwin, Chautauqua Institution, 1977

Chautauqua: Its Architecture and Its People by Pauline Fancher, Banyan Books (Miami, Florida), 1978

Jousting (p. 94)

The Known World Handboke, Society for Creative Anachronism (Berkeley), 1979

The Waning of the Middle Ages by Johan Huizinga, Anchor Press/Doubleday, 1954

Le Morte d'Arthur by Sir Thomas Malory, edited and abridged by Norma Lorre Goodrich, Washington Square Press (New York), 1963

The Age of Arthur by John Morris, Scribners, 1973

The Atlas of Medieval Man by Colin Platt, St. Martin's, 1980

Art of science films (p. 106)

Computer Graphics by Melvin L. Prueitt, Dover, 1975

"Computer Graphics . . . How It All Began and Where It's Going" by George Chaikin and Kathie McHugh, *Business Screen; A Backstage Publication*, August 22, 1980

"Science Films" (brochure), available from Los Alamos National Laboratory, Mail Stop 415, Los Alamos, New Mexico 87545

Principles of Visual Anthropology, edited by Paul Hockings, Mouton (The Hague), 1975

William Walker (p. 117)

The World and William Walker by Albert Z. Carr, Harper & Row, 1963

The War in Nicaragua by General William Walker, S. H. Goetzel and Company, 1860

The Filibuster by Laurence Greene, Bobbs-Merrill, 1937

Filibusters and Financiers by William O. Scroggs, Russell & Russell (New York), 1969

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Smithsonian highlights

Folklife Festival this month features crafts, food, foot-stomping music.

Welcome back, folks. The annual Festival of American Folklife, which for the last four of its 15 years has been an autumn happening, is returning to summer, and the calendar is simply busting out all over. The ten-day, jam-packed program of music, crafts demonstrations and ethnic food will run June 24-28 and July 1-5 on the Washington Monument grounds, overlapping with the annual Fourth of July celebration, July 2-5, at the nearby Museum of American History, as well as with the Air and Space Museum's fifth-anniversary events, scheduled July 1-5.

Always an exuberant affair, this year's Folklife Festival includes an American tent show with entertainers, medicine talks, melodramas and patriotic lectures or "chautauquas." Slavic-Americans will demonstrate traditional cooking; various dishes will be on sale. Southwesterners will build an adobe house; Southeasterners will make quilts, pottery and baskets. Native American Ojibwa (Chippewa) will carve pipe stems, tan deer hides, and build a ten-foot canoe (which may be auctioned off at the end of the festival). A special children's area will feature music and handicrafts, and a folklore-of-the-deaf program includes signing instruction, storytelling and games. As for music, there'll be daytime and evening concerts of black gospel and blues, Appalachian soloists and string bands, native American songs and fiddlers from the New England states.

The lineup is so varied that it illustrates well what the American Folklife Festival is all about.

Special June events

Freer Gallery of Art
Eastern Kufic Calligraphy—New exhibit features 12 Koran pages from the 10th-12th centuries.

National Air and Space Museum
Pawnee Stars (June 6, 9 A.M.)—Monthly sky lecture, Spacearium.
The Multiple Mirror Telescope: First of a New Generation (June 17, 7:30 P.M.)—Lecture by MMT Observatory Director Jacques Beckers.

Cooper-Hewitt Museum (New York)
Gardens of Delight (June 9-August 23)—Major exhibit of horticulture and its reflections in paintings, glass, ceramics, textiles and other arts.
The Moving Image (June 16-August 16)—Artwork for animation films spans 64 years and features such favorites as Cinderella, Pogo, the Pink Panther, Betty Boop and Fritz the Cat.
Pottery (through July 12).

National Museum of Natural History
Galápagos: Born of the Sea (June 6-August 2)—Feodor Pitcairn's photographs of exotic underwater life.
Deep Sea Dives to Biological Frontiers (opens early June)—Animals, photos and a large, scale model of *Alvin*, the Navy research submersible, illustrate exploration of the Galápagos Rift and East Pacific Rise, once thought to be relatively barren ocean floor.
Scenes of Contemporary Egypt (through October)—Color photographs by Betty and Donald Wiechec.
Renaissance of Islam: Art of the Mamluks (through July 19)—Major exhibit of 13th-16th-century manuscripts, metalwork, glass, ivory and textiles of these impressive bodyguards-turned-rulers.

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National Museum of American Art
Children's Day: Rhythm and Red, White and Blues (June 6, 10 A.M.-4 P.M.)—Make fantasy animals, edible art and other paper and fiber forms at this annual art day for families; free.
George Catlin: The Artist and the American Indian (June 5-September 13)—Some 100 paintings reflect Catlin's interest in recording a vanishing way of life.
New Accessions (June 12-November 1)—Some 20 paintings and sculptures.

National Museum of American History
Thomas Jefferson and Science (through July 5)—Specially collected objects.
A Century of Humanitarian Progress: 1881-1981 (through September 7)—A tribute to the American Red Cross and Clara Barton (SMITHSONIAN, May 1981).
The Changing American Farm, 1831-1981 (ends November 1).

Hirshhorn Museum & Sculpture Garden
Kenneth Snelson (June 4-August 9)—Twenty-year retrospective by this American sculptor includes large-scale works installed on the Museum's plaza (p.26).

National Portrait Gallery
Champions of American Sport (June 23-September 6)—Portraits and other memorabilia of 100 athletes since the 1830s.
Bret Harte: Chronicler of the Gold Fields (through July 12)—Portraits, poems.

Renwick Gallery
The Grand Beehive Exhibition (through December 13)—Utah's symbol on display.
The Animal Image: Contemporary Objects and the Beasts (through August 30).

Smithsonian events

For tickets to June Resident Associate Program events, call 357-3030:
Many Happy Returns—Eighth annual boomerang festival and competition (June 13, 1 P.M., Polo Field); free tickets available for lecture (June 6, 10:30 A.M.) and workshops (June 6, 1 and 2:15 P.M.).
Front Royal Weekend (June 12-14)—Animal research seminar introduces some of the world's most exotic animals.
James Cagney: Film Series (Five Sunday evenings, beginning June 14, 6 P.M.).
Renaissance of Islam: Art of the Mamluks—Three-lecture series, June 17, 24, July 1, 8 P.M.
The Revolution in Menswear (June 4, 8 P.M.)—Discussion by six women designers.
An Evening with Bruce Davidson (June 9, 8 P.M.)—Talk by leading photographer.
Andrea Palladio: Master Architect (June 10, 2 and 8 P.M.)—Lecture by architect William Ellis.
Manifestations of Shiva (June 22, 8 P.M.)—Illustrated talk by Joseph Dye.

Radio Smithsonian

Pandas, American sports heroes and Thomas Jefferson's contributions to science are among the summer listings for Radio Smithsonian and Smithsonian Galaxy, two programs broadcast nationwide. To find out which station in your area carries either program, write: Smithsonian Office of Telecommunications, A&I 2472, Washington, D.C. 20560.

Smithsonian Institution Traveling Exhibition Service

SITES circulates exhibitions to hundreds of cities outside Washington. To sponsor a show in your community, write to Eileen Harakal, SITES, Smithsonian Institution, Washington, D.C. 20560. Here are some June exhibits:
Loveland, Colorado (June 27-July 26)—*Tallgrass Prairie: An American Landscape*, First National Bank of Loveland.
Chicago (June 13-September 8)—*The Year of the Hopi*, Field Museum of Natural History.
Indianapolis (June 13-July 12)—*We'll Never Turn Back*, Indiana National Bank.
South Bend (May 30-June 28)—*Posters for Victory—World War II*, The Art Center.
Logan, Kansas (June 13-July 12)—*The Contemporary American Potter*, Dane G. Hansen Memorial Museum.
Minneapolis (May 23-July 5)—*Musical Manuscripts*, Walker Art Center.
Cincinnati (May 23-August 9)—*Butterflies and Moths*, Museum of Natural History.
Dayton, Ohio (June 6-July 5)—*American Drawings III*, Dayton Art Institute.
Portland, Oregon (June 27-July 26)—*Invisible Light*, Portland Art Museum.
Philadelphia (June 1-August 30)—*Ice Age Art*, Academy of Natural Sciences.
Chattanooga (June 6-July 5)—*The Great West, Real/Ideal*, Hunter Museum of Art.

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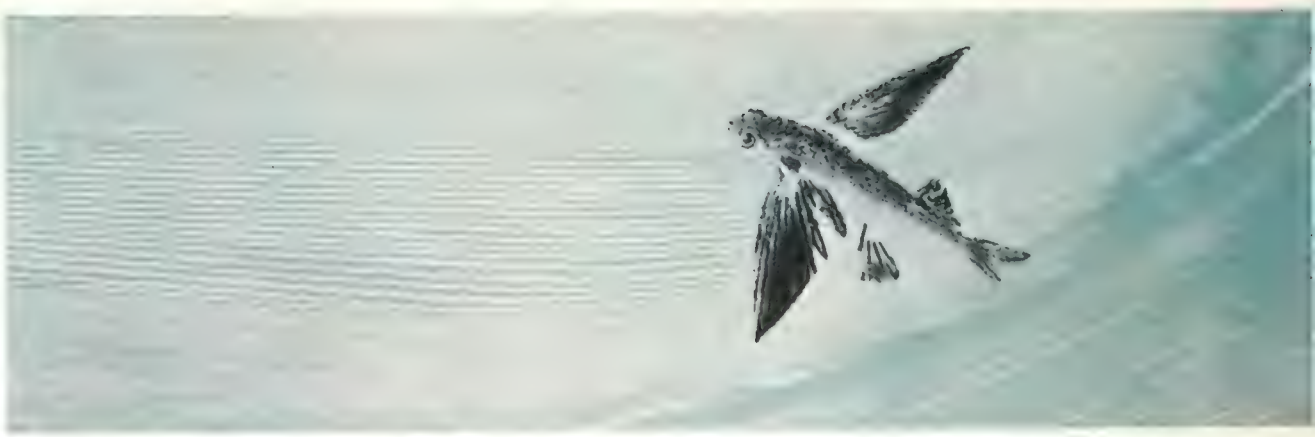

Dinah Bowman's *Surfing in the Wake* is among fish and nature prints in new traveling exhibition; paper is usually placed over inked fish to make rubbing.

"Obtain a very fresh fish. . . . Keep it cold and try to print it within 24 hours. Otherwise freeze the fish; it will print well when thawed." So begin instructions for an activity that to many is art, to others a hobby—the printing of fish, plants, shells and other forms of nature.

A new exhibition of these works, "Pressed on Paper: Fish Rubbings and Nature Prints," shows impressions so delicate that many look as if they are about to float out of their frames. Yet nothing is imaginary: the collection of images on pages 152-53 displays such details as suckers on the octopus' tentacles, color patterns of the rockfish, the tiny pointed teeth of a pomfret. The exhibit of some 50 prints, organized by the Santa Barbara Museum of National History and the Nature Printing Society, will tour through 1983 with the Smithsonian Institution Traveling Exhibition Service. First stop: New York's American Museum of Natural History, June 27-July 26.

Fish and nature printing has developed as an art form in America over the past 40 years, although the techniques may go back to Man's attempt to make prints on cave walls. Examples of plant printing occur in 17th- and 18th-century

For *Orange and Blue Group,* Connecticut artist Robert Cale arranged his own "school" of flatfish on a table, printed them with oil-based ink, later dyed the paper. A commercial fisherman at the time, he now teaches printmaking.

European books. *Gyotaku,* or fish rubbing, developed in Japan in the early 1800s, partly as a way to document a catch. Ben Franklin printed three blackberry leaves and a willow leaf on Colonial currency, ostensibly to frustrate would-be counterfeiters.

So, you may ask, how do you make a fish print? That brings us back to "Obtain a very fresh fish. . . ." According to Christopher Dewees, fisheries biologist at the University of California Division of Agricultural Sciences, you choose a fish with bright red gills and clear eyes, preferably one with large rough scales and a flat body. Bluegill, flounder, bass or perch are good for beginners. You will need thick water-based ink, several brushes including a fine one for painting the eyes on the print, and cloth or absorbent paper—newsprint or *sumi-e* sketch paper. Handmade paper is best, but also is more expensive and not recommended for beginners. Newspaper, plastic modeling clay for supporting parts such as fins, straight pins and glass to mix ink on—that completes the basic kit.

Wash the fish, dry it and lay it out on newspaper. Brush on a thin layer of ink in both directions to catch ink under the scales. Place the paper over the fish and press with your fingers, trying to avoid wrinkles and movement. This is the part of the process savored by many printers, the special time to *feel* the art, to enjoy the tiny contours of the fish or the pattern of a leaf. "I try to teach students to communicate with the subject," says F. G. Hochberg, curator at the Santa Barbara Museum of Natural History. "The essence is to show the subject really exists and you have touched it. With printing, you are combining art and nature."

Unfortunately for the novice, the end result may not be as rewarding as the means (although there is the advantage of possibly being able to eat the subject). "There's no question that the techniques of fish printing are simple," says Dewees, "but to master the art takes a lot of practice." Even experts pull several "proofs" and experiment with different colors, inkings and arrangements. Printing methods tend to vary from artist to artist, subject to subject.

Sometimes a "ghost" image is included, usually obtained from a second printing without re-inking the fish. A salmon may chase a shrimp on the paper. A flounder, a crab and a shell may inhabit the same frame. Some artists have been known to work with live fish: the subject is inked, rubbed, washed, and then returned to the water, leaving perhaps its own signature with a flip of the tail.

—Carol Simons

Bigscale Pomfret is work of museum curator and zoologist F. G. Hochberg.

Christopher Dewees repeated his *Red Banded Rockfish.*

Field biologist Robert Little printed *Tropical Seed Pods.*

Catherine Engel's *Slipper Lobster* is tough subject.

Gyotaku, fish rubbing, is popular in Japan; here, *Flying Fish* by R. Nakimizo.

Syuho Rokuhara's *Gold Fish* shows true coloring.

Robert Cale printed *Spotted Eagle Ray* in 1974.

Spotted Surgeon Fish by William Twibell appears with a "ghost" image.

Rubbings can show details such as suckers on Cale's *Octopus*.

F. G. Hochberg set up *Wolf-Eel* to run along the edge of the paper.

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Glacier National Park—July 4-13: From prairie and forest to tree line and summit: learn the story of varied life zones, explore Glacier's dramatic terrain and enjoy the comforts of a lodge at night.

Desolation and Gray Canyons—July 22-August 1, September 30-October 11, or October 12-23: A white-water trip for the adventurous on Utah's Green River.

Salmon River—July 28-August 4: Spectacular mountain scenery; see bears, bighorn sheep and pine forests while rafting in Idaho's vast primitive area.

Grand Canyon—August 14-24 or August 22-September 1: The light and shadow of a sublime natural spectacle, seen on a raft trip down the Colorado River.

The North Woods—August 20-28: Minnesota's lakes, streams and hardwood forests are the setting for a hiking and canoeing natural history program.

Hopi and Pueblo Country—September 12-21: Enjoy autumn colors and study Southwest Indian cultures with visits to Mesa Verde, Chaco Canyon, Hopi Reservation and Canyon de Chelly.

California Wine—October 4-10: Visit selected vineyards for tasting and lectures with distinguished wine masters.

Great Smoky Mountains—October 9-15: Camping, hiking and brilliant autumn colors enhance this spectacular natural history study adventure.

Asheville—October 15-18: Visit Biltmore and other historic homes in this mountain resort area during the peak of fall foliage.

Gems Weekend—October 16-18: The science and romance of gems and minerals with behind-the-scenes tours of the Smithsonian's renowned collections.

Florida Keys—October 19-25: An active program of snorkeling, canoeing and swimming to study the ecology of Big Pine Key and colorful coral reefs.

Washington "Anytime" Weekend: Choose any weekend to visit your choice of Smithsonian museums, spend two nights at Loew's L'Enfant Plaza Hotel or Hyatt Regency Washington, each close to the Mall, and see other sights in the city by Tourmobile. Reservations and payments at least ten days prior to arrival.

Foreign Study Tours

These tours range in size from small group experiences to charter adventures and vary in price from low cost to deluxe, depending on the type of travel, destination visited and length of trip:

People's Republic of China: Eight tours from May through November with three different itineraries; important cities and archaeological sites, Chang Jiang (Yangtze River) gorges.

Alpine Countryside—June 6-21 or September 12-27: Study folk art and architecture, flora, fauna and geology in a charming Austrian mountain village.

Waterways of France—June 28-July 9: Lively Paris followed by an MTS *Argonaut* study voyage to Brittany, Bordeaux, the Breton Islands and Mont St. Michel. Exclusive excursions, festive dinners and distinguished guest lecturers enhance the program.

Wales—July 4-17: Savor dramatic landscapes, visit archaeological sites, fishing villages, mines, manor houses and old castles; attend the International Music Festival at Llangollen.

Finnish Lakes—July 10-26: A choice of travel to the medieval coastal cities of Turku and Porvoo or to the historic Russian borderlands is followed by a lakeland steamer cruise and the Savonlinna Opera Festival. Concludes in Helsinki with a full program of music, design and architecture.

An Alpine Walk—August 2-16 or August 16-30: A 125-mile hike through the Swiss Alps to study peaks, waterfalls and flora.

Oxford/Smithsonian Seminar—September 11-26: Oriental Ceramics and Anglo-Saxon Art are among ten in-depth courses taught by Oxford faculty. Live in Worcester College and visit Cambridge, Bath and Stratford for a performance.

The Ancient World of Peru—September 18-October 2: Visit Lima and major archaeological sites along the coast; then explore the Inca capital of Cuzco, amazing Machu Picchu and colorful Indian markets.

Canadian Rockies—September 22-30: Snow-capped peaks, lakes and forested valleys provide scenic grandeur for hiking and natural history study at Banff, Lake Louise and Jasper.

Salzburg Seminar—October 3-18: Live in the 18th-century lakeside palace of Schloss Leopoldskron while studying the Baroque Era or the history of opera. German lessons, museum visits, theater and concerts enhance plenary lectures in this setting of extraordinary beauty.

Portugal—October 6-20: Explore Lisbon's fine museum and art collections before traveling to Alto Alentejo or Old Lusitania to see fortified hilltop cities, isolated castle towns, cathedrals and monasteries. Enjoy the charm and cultural diversity of the Portuguese.

Kyoto Seminar—November 6-22: A unique program to study Japanese culture and live in Japanese style. Scholars conduct seminars in art, history and introductory language lessons and lead field trips to the great temples, shrines and lovely gardens of Kyoto and Nara.

India Wildlife Safari—November 16-December 11: Visit major wildlife sanctuaries to observe the magnificent animal life of the subcontinent. Travel to parks in Northern and Central India and Nepal's famous Tiger Tops.

Write National Associates, A&I 1278 Smithsonian Institution, Washington, D.C. 20560 or call (202) 357-2477 for specific tour brochures

in Washington

Selected Studies Seminars

Now is the time to enjoy the latest popular programs at the Smithsonian which combine excellent speakers and small, behind-the-scenes tours. Choose from:

Chinese Ceramics—September 20-25: Connoisseurship of the timeless beauty and outstanding craftsmanship of famous masterpieces. Highlights exquisite export wares, enameled porcelains, recent discoveries, dating controversies, detection of fakes and the market today, as well as tours of renowned collections.

Genealogical Research—September 27-October 2: Taught by Milton Rubincam, the "dean" of American genealogy, Marilyn Duncan and other leading authorities, participants learn how to conduct research in major genealogical repositories such as the National Archives, Library of Congress and DAR Library.

Aircraft Restoration: How To—October 4-8: Master craftsmen of the National Air and Space Museum share their numerous techniques in workshops at the Paul E. Garber Facility (formerly Silver Hill).

American Antique Furniture—September 20-25: Connoisseurship of masterpieces, 1650-1840. Includes great collections, detection of fakes, care of antiques and tours of the elegant Diplomatic Reception Rooms at the Department of State and Winterthur Museum.

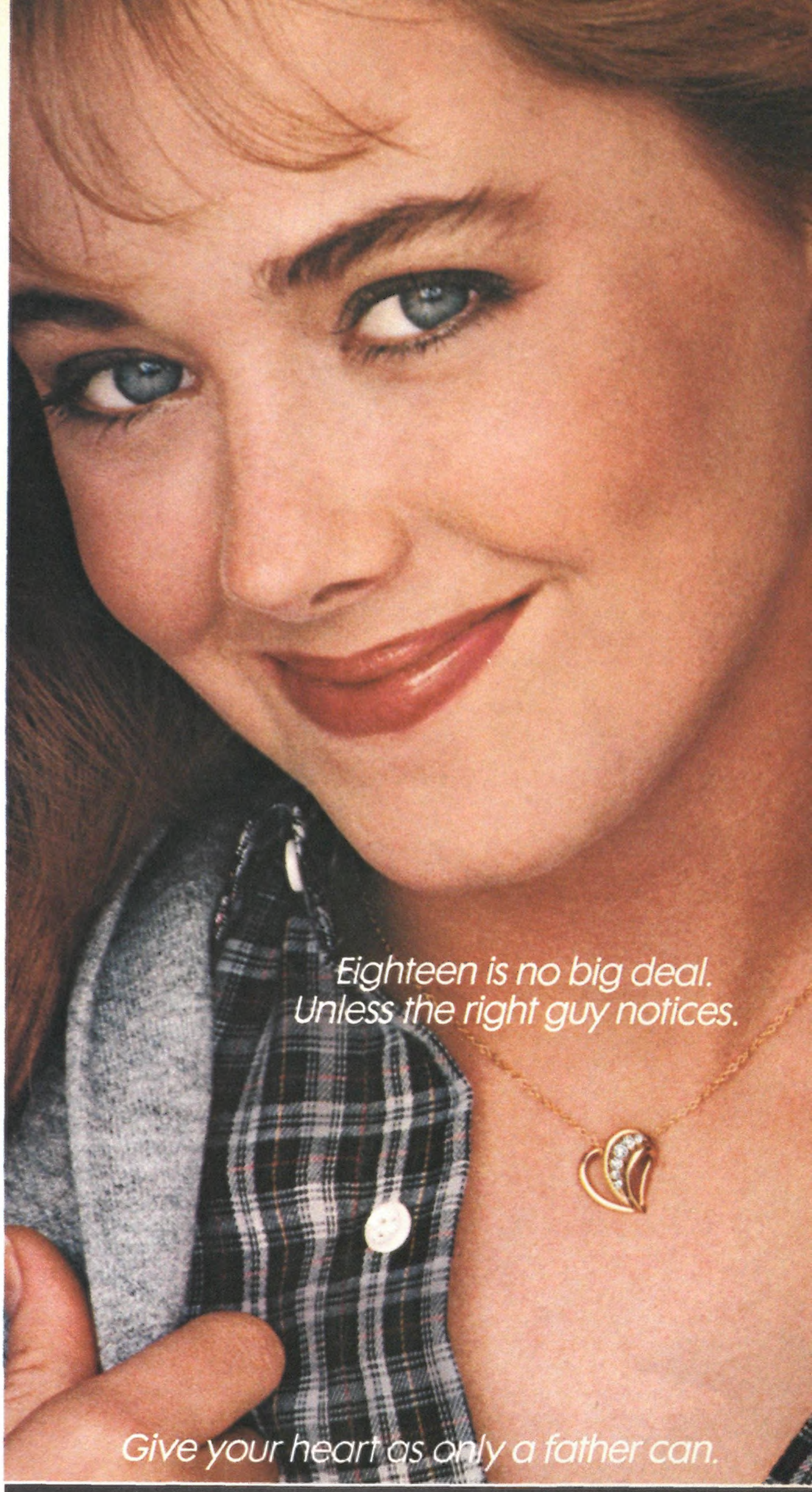
Tibet: Lost Horizons—October 18-23: The culture, history and art of this rich civilization along with behind-the-scenes tours of the Freer Gallery and the best private collection in the United States.

Post-Impressionist Masters—October 25-30: Bill Kloss explores the outstanding paintings of artists such as Gauguin, van Gogh and Cézanne in lavishly illustrated lectures and tours of great museums.

Historic House Preservation—November 1-6: Cosponsored with the Historic House Association of America; nationally known experts advise on all aspects of restoration and tour successful projects from lovely town houses to country estates.

World War I Aviation—November 15-20: NASM's outstanding aeronautical staff and guest experts offer new insights into how the world's major air forces developed, and how quantum jumps in performance were achieved. Includes tours of many of the only surviving planes.

r (202) 357-2475 for seminar brochures.



A diamond heart from mom and dad is a special gift of love. Before the next important occasion in your daughter's life, see your jeweler for a selection. The pendant shown is available for about $695. Prices may vary.

A diamond is forever. De Beers

By Richard L. Williams

The safest breakfast: just don't have any

Taped to the coffee can in the kitchen, one morning, was a not-so-neatly hand-printed label. *CAUTION: Causes cancer of the pancreas in laboratory animals.*

Taped to the can the next morning was another label: *PLEASE! Your revered father and saintly mother are not laboratory animals.*

The first label maker, a teen-ager, had been listening to the radio, maybe with only half an ear. But next day the newspapers more than confirmed the awful news: scientists at the Harvard School of Public Health had found a strong statistical link in *humans,* never mind laboratory animals, between coffee drinking and cancer of the pancreas. Nothing was proved as yet, but the head of the Harvard research group said he'd stopped his own coffee drinking a month ago as results of the study, which was reported in the *New England Journal of Medicine,* began to come in. It was enough to give one pause between cup and lip.

"They're taking away our breakfast!" cried one neighboring coffeephile as he looked up from the morning paper. By "they" he meant the federal Food and Drug Administration and the Department of Agriculture, as well as Harvard, but he had a point and his cry was surely echoed in the mountains of Colombia and the hills of Brazil.

Already he had stopped starting his day with bacon, sausage or ham, because the FDA and DOA once became alarmed, though more recently they have backed down, about those meats being cured with nitrites.

He had cut out eggs (he used to have two, sunny-side-up flanked by crisp bacon, or sausages or ham every morning), to cut down on cholesterol.

Likewise salt (not that he has much left to sprinkle it on), because it's full of sodium. High blood pressure and all that kind of problem.

And hot cross buns, in season, and other breakfast goodies. Too much sugar goes into the recipes for those pastries, he read somewhere.

And saccharin, as an artificial substitute for sugar. It was questioned by the FDA, then only required to be identified as an ingredient in various products. But to him, and he is hardly alone, it is still under a cloud. He wouldn't think of putting it in his coffee, but now the coffee has a clouded future itself.

As for nondairy creamers, which come in those cute little cups that it's so hard to peel the tops off of, he has stopped using them, too. For they may contain coconut oil, a vegetable oil high in saturated fats.

He doesn't like cereals all that much, "natural" or otherwise, and anyway doesn't like munching them with one percent or skim milk (whole milk, with up to three times as much milk fat, is therefore off the list).

He sometimes pines for the old days when you could just pour on the cream and sugar, if you could afford it, without giving a thought to the consequences. Which did, indeed, make cereals more palatable.

Toast still seems safe, he figures. But dry toast—no cholesterol-laden spread, no sugar-laden jam. No fun, either, but no doubt filling.

Now he is not really hypochondriacal about all this giving-up, but he does wonder some mornings what's next, or rather what's left?

Well, he can have a piece of fruit, a piece of toast and a glass of juice (all so far unbanned) or water (but better watch out for that, too) for breakfast. That's breakfast? "Have a nice day," did someone say? Bah! One would hate to accuse the Food and Drug Administration, the Department of Agriculture or the Harvard School of Public Health, of being against "the most important meal of the day," or against eating, but their research does seem to point that way.

My own office is just above that of the man who cried that they're taking away breakfast. On my sunny window sill sits a big split-leaf philodendron. I often forget to water it and when I remember, there's no water handy. And so what's left of a partly drunk cup of coffee goes onto the plant.

I intend to go on drinking coffee until the philodendron shows symptoms, brought on by its own involuntary coffee drinking, of dread illness. These symptoms, of course, could take as many as 20 or 30 years to manifest themselves.

Up to now, though, the philodendron looks happy and healthy as can be. When, as and if the symptoms appear—and there apparently is plenty of time to find out what they are, if no time thereafter to do anything about them—I'll stop feeding the plant my leftover coffee and put a label on its flowerpot:

WARNING: Living may be dangerous to your health.

©1981 • 6 Years Old. Imported in Bottle from Canada by Hiram Walker Importers Inc., Detroit, Mich. 86.8 Proof. Blended Canadian Whisky.

"The Best In The House" for over a century.

Hiram Walker's unique, light-tasting whisky earned its reputation as the finest whisky in exclusive clubs from the time it first appeared. That's how it became "Club Whisky."

In 1891, a new U.S. law required the country of origin to appear prominently on a product's label. Hiram Walker proudly added "*Canadian*" to Club Whisky and people just as proudly began ordering "*Canadian* Club."

Today people enjoy Canadian Club so many ways: on the rocks, smoothing out sours or Manhattans and with favorite mixers. Because it's lighter than Scotch, smoother than bourbon. And it's still "The Best In The House"® in 87 lands.

"Canadian Club®"

THE LUXURY SEDAN THAT DID NOT HAVE TO BE RE-ENGINEERED TO FACE DIFFICULT TIMES.

Will the trials and tribulations of the automobile industry never end?

First came the Environmental Protection Agency and the need to re-engineer to meet the emission requirements.

Then came the gas crises and the need to re-engineer to meet the demands of the gas pump.

Then came last year's money crunch and, along with it, the most serious challenge of all: the enlightened consumer.

And, with a certain predictability, the luxury sedan makers of the world reacted by bringing forth a slew of "revolutionary" new automobiles, each radically re-engineered to answer the perfectly reasonable question, "What is it that makes an expensive car worth the money?"

A question which is perhaps uniquely answered by the BMW 528i.

TECHNOLOGY DECADES AHEAD OF THE COMPETITION.

As some of the world's exalted automakers rush to update anachronistic technology—cutting cylinders, resorting to diesel fuel, tinkering with all manner of electronic gadgetry—one caveat should be observed: evolution, as any automotive expert will testify, is always far preferable to revolution. We are, after all, dealing with a machine made up of several thousand parts.

Which is perhaps the most convincing case for the BMW 528i. A car developed and refined over two decades. An engineering concept so sound that an era of automotive restrictions has, if anything, proven it to be even more correct.

A SYNERGISTIC USE OF ELECTRONICS AND MECHANICS.

Car and Driver magazine has seen fit to predict, "In the not-too-distant future, most cars will be equipped with some form of electronic fuel injection simply because it is a more precise fuel-delivery system."

Far from just beginning to dabble in the sophisticated arena of electronics, BMW first installed such a system in 1975.

With every engine revolution a computer receives and assesses signals from electronic sensors within the 6-cylinder engine itself. Then instantly determines the precise air/fuel mixture to be injected into the cylinder ports.

So flawless is this marriage of electronics and mechanics that it has resulted in a virtual automotive paradox: an engine which not only performs with more fuel efficiency* but with more power as well.

THE DRIVER COMPLETES THE MECHANICAL CIRCUIT.

The classically restrained interior of the 528i, denies one nothing with regard to appointments or accessories.

But, perhaps because of our involvement with motor racing, we take a wholly different approach to the interior of an automobile.

An approach which includes the driver as a functioning part of the car itself.

A standard 5-speed transmission (automatic is available) affords the unique opportunity to pick and choose one's own gears.

An advanced suspension system—independent on all four wheels—provides what one automotive journalist hailed as "a confidence-inspiring stability." Giving the driver an uncanny feel for the road.

EXTRAORDINARY ENGINEERING IS AN EXTRAORDINARY INVESTMENT.

According to the October 1980 NADA Used-Car Guide, over the past five years, the 5 Series has retained an astonishing 77.9% of its original price.

A figure which neither the Mercedes 280E, nor the Jaguar XJ6, nor Cadillac can approach.

If you find the notion of owning a BMW intriguing, contact your nearest BMW dealer and arrange for a thorough test drive.

THE ULTIMATE DRIVING MACHINE.

BMW, MUNICH, GERMANY.

*For example, the BMW 528i (with standard transmission) delivers 18 EPA estimated mpg, 30 estimated highway mileage and, based on these figures, an estimated mpg range of 295 mi. and a hwy. range of 492 mi. (Naturally, our fuel efficiency figures are for comparison purposes only. Your actual mpg and range may vary, depending on speed, weather and trip length. Your actual hwy. mileage and hwy. range will most likely be lower.) © 1981 BMW of North America, Inc. The BMW trademark and logo are registered trademarks of Bayerische Motoren Werke, A.G.